

Showers, Nature intends this, and all Vegetables require it: but there are Seasons in which the Course of Nature is prevented, interrupted, or stopped: in these let the Planter in the Hop Business assist her at whatsoever Expence.

No Plant requires the Spring Rains more than the Hop: some will do without them for the Time, and recover afterwards when Rains fall, if ever so late; but if the Hop be defrauded of its due Watering in Spring, it will be seen in the Fruit in Autumn. The Planter being informed of this, will know it his Interest to give the Assistance Nature chances to withhold.

We have for this Reason observed, that in the Choice of a Piece of Ground for Hops, the Planter should, if possible, fix upon a Place where there is Water near.

The Time of watering Hops is a material Consideration. We have observed that it is not to the Advantage of the Hop to shoot early, because the Plant is by that thrown in the Way of many Accidents: therefore the Time of watering is not early, because Water will promote their Shooting.

The first Season is just before the Ground is pared, and the Hills made up. This will dispose the Hops to shoot vigorously just when it should; that is, just when the Hills are in a Condition best to support their Growth.

If the Season prove tolerably favourable, the Trouble of watering concludes at this once; but if no Rains fall in the following Month, it must be repeated at the End of that Time; and if the ensuing Summer continue dry, it may be repeated once more about the Time of the Hops flowering, with great Advantage. Nothing contributes to fill and perfect the Hop so much as a proper Degree of Moisture at the right Seasons,

In the watering the Hop Ground, a sufficient Quantity is to be allowed: to do it slightly is not to do it at all, the Planter throws away his Expence, because he grudges to do what is sufficient: the Hop is a large Plant, and great Supplies both of Water and Earth are to be given it, or it will never be able to support itself to any Advantage.

Every Time the Ground is watered, let the Spaces be pared afresh, and the Parings added to the Hills; this keeps in the Moisture, and defends the Roots and Stems towards the Bottom, where they are most capable of Injury from the great parching Heat of the Sun. The Vapour of this Water also ascending through these Parings, mellows and softens them, so that they become an excellent Manure as well as Shelter; and the Weeds are destroyed by the same Operation: so that in this Article thus conducted, nothing less is done than this; the Hop Roots are refreshed, the Land is not exhausted by Weeds, and it is given to the Plants in the best possible Condition for their Support.

Sometimes particular Plants of the Hop will succeed but poorly, or single Hills will dwindle when the rest of the Ground is flourishing enough: in this Case as the Disorder is particular, a particular Remedy is to be applied.

Let these Hills be watered frequently with

Water in which Pigeons Dung is mixed; making a Basin round the Plants, that none of the rich Water may be lost. If this does not succeed, let the Hills be carefully opened, and let some Hogs Dung mixed with some rich Earth, be put in about the Roots.

About NOVEMBER let the Ground be particularly well dug, and broke round these Hills, and they will by this Management equal, if not exceed the best of the others.

Having thus laid down the Method of managing the Hop Ground from the Beginning to the End of the Work, we shall communicate to the Publick certain Improvements upon the common Practice made by others. They have fallen into our Hands in the Form of Letters, from various Persons, in Consequence of those Advertisements, wherein at the first setting out of this Work, are requested the Assistance of all who had practical Knowledge, and had Generosity of Spirit to communicate that Knowledge for the publick Good.

We have not inserted the Substance of them in the Chapters, where we have treated of the Articles they concern, partly because not having experienced them ourselves, we have no right to recommend them to the Planter as certain Practice; and, partly, that we might not defraud their Authors of the Merit of them. We believe them to be right and useful, otherwise we should not have inserted them, but the surest Method of knowing will be by Trial, to which we recommend them, not doubting the Success, though we are not able from Proof to insure it.

L E T T E R I.

On the Choice of Ground, and Manner of Planting.

S I R,

" If the Experience I have had in the Hop
" Way is of any Use, I shall be glad to serve
" you. In the first Place, if you expect a good
" Ground, let it be free to the Air. I find
" wherever the Air can't get through, Hops
" blast, and in the Middle of the Ground they
" shall be all spoiled, at the same Time they
" are quite good at the Sides. One great Elm
" in a Neighbour's Ground has spoiled me many
" a Bag of Hops, it stands just where the Air
" should pass; and there are two others behind
" it, so that I am then quite choaked up: my
" Hops for eight, ten, or a Dozen Hills just
" there are many Years spoiled, while all the
" rest are in Order.

" I find it inconvenient to have all my Hops
" ripen at a Time, for there is oftentimes no
" getting Hands enough to manage them. For
" this Reason I now plant three Sorts; the
" Early-white, the Long-white, and the Oval.
" The first of these ripens a Fortnight before
" the two others, and the Oval is commonly a
" Week later than the Long-white. So I have
" three Seasons. The Early-white don't yield
" a great Crop, but they come early to Mar-
" ket, and fetch a Price, so I find one Thing
" answers for another: and this I know, since
" I followed this Way, I have always more
" Profit.

“ Profit than I used to have, and not half the
 “ Trouble. If others will do the same, they’ll
 “ find the Truth of what I say.

I am,

With Respect,

Your humble Servant,

Arthur Collins.

LETTER II.

*On the Planting and Management of Hops
 the first Year.*

S I R,

“ Whereas it is the common Way to plant
 “ four Sets of Hops in a Hill, one at every
 “ Corner, I bethought me in planting a new
 “ Hop Ground, to try Practices, and plant
 “ more: so in some I put twelve Sets, three on
 “ each Side, in other some ten, in some eight,
 “ and in others seven, six, five, and others
 “ four; in some also I put only three, and in
 “ others two, and in a few but one Plant a-
 “ piece, sticking it just in the Centre.

“ Now by what I find after many Years
 “ Tryal in this new fashion’d Hop Ground,
 “ our Planters have not found out the right
 “ Number. Where I have only one Hop in
 “ a Hill, it bears full as much as two in the
 “ common Way; and where I have ten or a
 “ dozen, they starve one another, and don’t
 “ yield so much as four. I find therefore upon
 “ the whole, that placing the Hills at the com-
 “ mon Distance, each will very well feed six
 “ Plants, if the Ground be well tilled between,
 “ and they will yield every one nearly as much
 “ as one where there are only four. But sup-
 “ pose the six thus yield as much as five, when
 “ there are only four on a Hill, still it is gaining
 “ a great Advantage.

“ I find that my single Plants are liable to
 “ fewest Damages, and the thickest planted to
 “ most: but I don’t see any material Differ-
 “ ence in that Way, between six and four on
 “ a Hill. This I thought good to tell for the
 “ Benefit of others, depend upon it six Plants
 “ in a Hill is the best Number can be raised.

“ There is one Thing more it may not be
 “ amiss to tell you of. We have got a Way
 “ here of losing the first Year of a new Hop
 “ Ground, having a Notion that to let the
 “ Plants bear the first Year, weakens them for
 “ ever afterwards. I’ll tell you how that is. If
 “ the Ground be planted in Spring, as some do
 “ it, then there is so little Time between that
 “ and the Hop Season, that there will be a
 “ small Produce, and it will be better to pre-
 “ vent than encourage it, for the Plants had
 “ better be rooting than yielding a few scatter-
 “ ing Fruit: but the right Season of planting is
 “ the Beginning of OCTOBER, and in that Case
 “ the Sets root before the Cold of the Winter,
 “ and have Time to strengthen themselves in
 “ the Ground before the Spring shoot. They
 “ will therefore come up strong, and as well
 “ as some Spring planted Hops the second

“ Year. In this Case they will yield a very
 “ good Gathering the first Summer, and it is a
 “ very idle and wasteful Thing to neglect gat-
 “ thering of them. I have found it thus in
 “ many other Things concerning Hops: People
 “ follow one another’s Practice right or wrong,
 “ without considering that what is right in one
 “ Respect, may be wrong in another.”

I am,

S I R,

Your humble Servant,

LETTER III.

On the picking of Hops.

S I R,

“ I have found many Inconveniencies attend-
 “ ing the usual Way of picking of Hops in the
 “ open Ground, for which Reason I have now
 “ many Years built for that Purpose. I am
 “ sensible the Name of Building is enough to
 “ startle People not used to these Things, but
 “ mine is only a Shed, the Cost very little, and
 “ the Convenience great on many Occasions.
 “ My Shed is only a Top, two Ends, and a
 “ Side, being open all the Length one Way;
 “ and the Materials of the cheapest Kind. The
 “ Length is two and twenty Foot, and the
 “ Breadth twelve. This conveniently holds
 “ two Frames in the picking Season; and at
 “ all other Times it serves to house the Tools,
 “ to put by any Thing like to be wanted,
 “ and in Winter to lay by the Poles. I never
 “ have my Poles above twenty Foot long, so
 “ there is two Foot over Room to hold
 “ them.

“ In the picking Season I set up two Frames
 “ lengthways in the Shed, and have just Room
 “ for the People to sit Back to Back between
 “ them.

“ My Frames are seven Foot and a half long,
 “ and three and a half wide; they are made
 “ of nothing but four Posts for Corners, set up
 “ firm in the Ground, with a Hair-cloth tack-
 “ ed over them, and a Couple of Forks to
 “ hold up the Poles. The Poles are laid over
 “ these, with the Vines over them, and the
 “ Pickers work along the Sides, and at the
 “ Ends, picking the Hops into the Cloths.

“ Thus I find no Damage nor Danger from
 “ Wind, Sun, or Showers, and my Work in
 “ every Respect goes on better than my Neigh-
 “ bours.

“ Many of them make the same Sort of
 “ Frames that I do, removing it from one Part
 “ of the Ground to another, but I have always
 “ found the fixed Shed best, and mine are not
 “ small Grounds. The Poles are ready to be
 “ laid up, and there is no Danger of Acci-
 “ dents. My Hops are picked clean and dry,
 “ and they are not afterwards broke by tum-
 “ bling about, for it is only taking up the
 “ Ends and Sides of the Hair-cloth, and they
 “ are carried away as it were in a Bag directly

The Person to whom the Proprietors of this Work have committed the Care of its Publication, having received Accounts, from many Parts of the Kingdom, of the great Damage done by the late Floods in overflowing large Quantities of Land, applied to that ingenious Gentleman who favoured them with the most judicious and useful Method of Stacking Hay to prevent its firing, published in a former Number, to request his Advice to the Farmers in this great Calamity: he has in Return been favoured with the following Letter, committed to the Care of Mr. OSBORNE, one of the Proprietors; which, with the utmost Gratitude for the Obligation, he here presents to the Reader.

Mr. OSBORNE,

Jan. 15, 1756.

S I R,

I Have perused Mr. -----'s Letter to you of this Date. That learned and useful Member of Society, as well as great Genius, does me much Honour in declaring, my simple Contrivance for Stacking Hay with Safety, met with the favourable Reception and good Opinion of the Publick; and that it has been of any Service and Credit to so important, and, as far as I am able hitherto to judge, so excellent a Work as the present *Body of Husbandry*; every Number of which I wait with Impatience, and read with Satisfaction; pleasing myself with a conscious View of Ten Thousand *Cornu Copia's*, and national Benefits rising out of it.

If the Remainder of this noble Work be equally considered, and equally supported by Science and Practice, I shall not hesitate to pronounce it an Honour to the BRITISH Nation, as well as the Undertakers; and doubt not but it will soon fly through the living Languages of EUROPE.

I flatter myself the Plan and Description of my new invented Granary, which I desired you to transmit to the Gentlemen concern-

ed, may merit their Consideration: it cost me much Thought and Contrivance to make it strictly supportable by the Laws of Pneumatics, and to answer all its Purposes with Oeconomy; and without the late ingenious Invention of Ventilators, to which the ENGLISH and FRENCH have hitherto confined themselves.

That learned Gentleman makes use of an Argument that will always command my Regard and best Endeavours, the *Publick Good*; and he has with Sincerity, my warmest Desires to serve them; and oblige him in his Request.

I shall first say, in the present Case, that I apprehend no Engine in Nature can be properly and efficaciously applied, to the speedy draining of great Surfaces of Lands accidentally overflowed.

We must allow that Wind, Sun, falling of Rivers, and Imbibition of the Earth are the Productions of the great Engineer: He leaves it to us to find or create Levels, in this particular Case, if we are impatient of his Operations; and He expects we should, on such Occa-

Occasions, add the Knowledge and Skill with which he has blessed us.

I shall only observe, nothing can be attempted by us, whilst one uniform Surface of Water covers contiguous Rivers, Drains, Ditches, and Lands, as in many Places it does at present; but the Moment such Rivers or Drains have acquired a natural Level, by the running off of some Part of the Inundation, the highest Parts of those overflowed Lands beginning to appear, the most adviseable Instrument to apply is the LINCOLNSHIRE trenching Plow, or, for want of it, a strong common two wheel Plow; beginning near the River, or Level's Edge, and cutting up as far as conveniently may be, into the shallow Verge of the stagnant Inundation: assisting the Cut occasionally with the Spade.

This main Cut, after the Waters have wholly disappeared, should be enlarged in Depth and Breadth, and several smaller lateral Cuts be made with the Plow, where the gradual falling of the Body of Water indicates; by marking out daily the successive Verges of all the ebbing Pools or Shallows, that approach nearest to the Level of the main Cut, and afterwards running the

Plow along such marked Lines of Direction, thereby opening the easiest Communications between the several Shallows and the main Cut; employing the Spade also in such lateral Cuts where necessary.

This is the best Time to discover the truest and most advantageous Situation for such open Drains, and to obviate an injurious Duration of such future Floods or Inundations, Water being the best and cheapest Level for the industrious Farmer when it happens so; and its Retreat, especially in large Pastures, should be carefully watched and staked out with small wooden Pins.

The young Farmer need only be told farther, that all sudden Floods, of short Duration, are greatly beneficial to Grass Lands, as they convey and deposit Matter of great Fertility upon the Grounds they so visit. But these differ widely from the present grievous continued Inundations. I heartily wish these Hints may prove useful, and am, with Compliments to ---- for the Honour he does me,

S I R,

Your obliged humble Servant,

JOHN STEVENSON.

to the Kiln, where they are emptied into
the Bed for drying."

S I R,

Your very humble Servant,

R— R—

C H A P. XXII.

Of Flax.

THE Value of Flax is encreased by the easy Manner in which it is to be cultivated. Scarce any Produce whatever may be made to bring in greater Advantages, and none is so much neglected. We import from Abroad at a great Price, what we might raise as well at Home; nor is there any Thing to discourage us from the Attempt. We have laid down in the several preceding Chapters, the Method of managing Hops; an Article of Difficulty, which yet in many Places is executed with great Familiarity; and, we hope, from the light wherein we have set it, that it will be in many more.

What we have to say of Flax, though we shall deliver its Management as fully, will be comprized in a much smaller Compass, and the Trouble of the Person who shall be induced to raise it, will come in a much smaller and shorter Way.

Flax is a slender, tall, and pretty looking Plant. It is too tender to keep itself well upright singly, but in a Field where it is sown together in a Body, nothing stands better: this is the Case with Wheat, which if a single Stalk were raised, would not be able to stand before the Wind; though in a Field it very well supports itself.

Flax is an annual Plant. Its Root is small and fibrous, and perishes as soon as the Seed is ripened. The Stalk is round and smooth, and it rises to three or four Foot in Height. The Leaves are small and narrow, and of a pale green. The Stalk grows strait and single to the Top, where it divides into three or four little Branches, and on these grow the Flowers, and after them the Fruit, containing several Seeds. The Flowers are large and blue, so that when the Plant is in Flower a whole Field together, it makes a very beautiful Appearance.

The Plant is thus known at sight, and is very pretty; the slender upright Stalks, small Leaves, and large blue Flowers distinguish it: when examined more nicely, each Flower is found to stand in a small green Cup, made of five pointed Leaves: the Flower itself in the same Manner consists of five Leaves; they are narrowest at the Bottom, and widen all the Way to the Top, so that the whole has the Shape of a Funnel. In the Center stand five very short Filaments, each having at the Top a Knob or Button, shaped like an Arrow's Head; and in the Centre of these is the young Fruit, on which grow five very short and small Threads, bending at their Tops, and having no Knobs or Buttons on them.

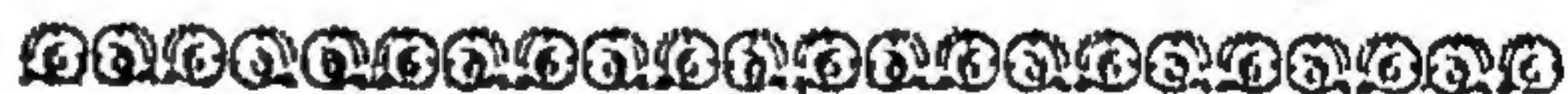
We have shewn that in the Hop those small Knobs on the Filaments, contain a Dust that impregnates the Fruit, and perfects the Seeds; they are of the same Nature in this, and all other Plants, but in this, as in most others, they stand together with the Rudiment of the Fruit, in the Bottom of one and the same Flower: whereas in the Hop, and a few others, they grow in different Flowers upon the same, or upon different Plants of the same Species.

The Husbandman will not be displeased that we thus inform him of the Structure and Nature of Flowers; we would have him ignorant of nothing that relates to his Profession, and this is no idle Curiosity: he who best understands Plants, will be able best to raise them.

In Books of Botany these Things appear very intricate, but we have explained them in a few familiar Words.

When the Dust from these Buttons has shed itself upon the crooked Filaments which stand among them, and which rise from the young Fruit, the Leaves of the Flower fall off. Although they are the gaudiest Part of the Plant, they are of no other Use than to defend these little regarded Threads from Injuries, while their Dust is ripening. As soon as that has shed itself upon the Points, which rise from the Rudiment of the Fruit, they die away and fall off. The Threads themselves also fall off, and as in this Case of the Flax, so in all others, nothing remains but that Rudiment of the Fruit or Seed Vessel we have described. This encreases in Size, and when ripe, is a Seed Vessel of a roundish Shape, but marked with five slight Ridges, and terminates in a Point. It contains ten separate Cells or Compartments, in which there are contained the Seeds: these are of an oval pointed Form, smooth, flatted, and brown, and there is only one of them in each Division or Cell of the Head.

This is the Description of the Herb which affords our Linnen. It has been known in very early Ages, the GREEKS having called it by the same Name, and used to the same Purposes with the present; and it seems to have been originally a Native of some of the Eastern Countries, though it is not easy to trace its Time of being brought into the North: at present 'tis cultivated in most Kingdoms, and as we shall shew, deserves to be much oftener raised in ENGLAND.



C H A P. XXIII.

Of the several Kinds of Flax, and Choice of the Seeds.

TIS one Thing to speak as a Botanist, and another as a Husbandman, this is seen in treating of the Kinds of Flax: the Curious in Plants reckon up no less than twenty, but the Farmer needs to know but one.

We shall not further particularize this, than that it is the Flax just described, and is the only Kind raised any where for Use.

We see a Kind of Flax wild about the Borders

ders of Fields in some Places, and it has been distinguished by some as different from the other, but it rises from Seeds of Flax scattered by Accident, and only differs from the right Flax in being smaller and weaker, as Things that run wild always do from such as are cultivated.

In a Crop of Flax a great deal will depend upon the Goodness of the Seed; and we find too often that this ripens but poorly in ENGLAND.

We have shewn on another Occasion, that most of our Neighbours import the Seed of their Flax from FLANDERS; but it is better to get it from the East. Every Plant has its native Ground on which it rises to the greatest Perfection, its ripening the Seed is the compleat Perfection of its Growth: and this will be best done where it is native.

We have observed, that it is natural to suppose Flax originally came from the East, and there is this Evidence in Support of the Conjecture, that it no where ripens its Seed so well.

For this Reason, that the Farmer may set out right in this Undertaking, we advise him to get his first Seed from the LEVANT, enough of it is imported every Year, only let him take Care to enquire for the right Sort, and to deal with a Person of Integrity who will not deceive him.

When he has got a Quantity of this, right and fine for his Purpose, it will be sufficient for some Time; the Seed of his own Growth raised from this, will be good three Crops, if it ripen favourably, so that he need not have any more for four Years; but by that Time, in Spite of all the Care he can employ, he will find it begin to run weak, and then he must have a fresh Parcel from the same Place.

We shall lay down the Rules by which our Husbandman may be secure of raising a profitable Crop of this Commodity; but let him take Care that he make no Mistake in the Seed: that would be a Fault no succeeding Care could remedy: such a Stumble at the Threshold would keep him for ever out of the House.

C H A P. XXIV.

Of the proper Land for Flax, and the preparing it.

WHEN the Husbandman has got his Seed, the next Thing is to consider on what Parcel of his Land to sow it. Flax will grow on almost any Soil, but it will grow where it will not thrive, and in this Case there will only be the Amusement of looking at the Beauty of its Flowers, for there is to be expected little Profit.

To raise it to the most full Advantage, it must have the best Ground that can be given it. Flax, though a small rooted Herb, exhausts a vast Quantity of Nourishment. Infomuch that it will impoverish the richest Piece of Ground in a little Time, but it very well pays the Damage.

The Field to raise it to Advantage, must have a light deep mellow Soil, the more like

Garden Ground the better, and it will never succeed so well as when it comes upon a new Piece of Tillage.

As to the Choice of Soils, a rich Loam is by much the most proper for Flax: and instead of following almost any other Crop, tho' with the best Dressings, to prepare for it; 'tis much the best to sow it on new broke up Ground.

The converting of Pasture into Arable, if the Soil suits Flax, is a very beneficial Opportunity for the sowing of it; but it will succeed best upon a broke up Saintfoin Lay; for the Flax roots very shallow, and the Saintfoin very deep, so that the Surface of the Ground, which is all the Flax meddles with, is left quite unexhausted.

On such a Field with a proper Soil and good Seed, Flax will yield a more profitable Crop to the understanding Farmer, than any Thing whatever; but in this Case, to continue the Benefit of such Crops, he must change not only his Seed, but his Ground at proper Seasons, for the same Land will not, with any Management whatever, bear many successive Crops of Flax to the Owner's Advantage.

This useful Product is an Exception to what has been said concerning the new Method of Husbandry by the Drill and Hoe Plow. Mr. TULL has said, and his Followers have repeated it after him, that by his Method of hoeing between the Rows, one Piece of Ground will be enabled to maintain the same Kind of Crop ever so long. Flax, whose Culture probably Mr. TULL had not experienced, proves the contrary; for Trial has shewn that no Culture or Management whatsoever, will enable the same Piece of Ground to bear Crop after Crop for several Years.

We do not give this as a Proof that the new Husbandry is not proper for Flax; on the contrary, there is no Crop whatsoever wherewith it so well agrees, nor is this to be raised any Way with near the Benefit that it is by the Drill and Hoe Plow; but still the same Land will not continue to yield it well. Half a dozen Crops are the most that can be got from a good Field by this Method; and it is not easy to get more than four by the common Husbandry.

After this the Field must be well manured for preparing it to raise some other Crop, and the next sowing of Flax is to be upon some other Ground.

What we have said of the new Husbandry in general, is thus explained under the several Particulars: it is better than any other Method; but it does not come up to all that has been written of it; and though it may in many Places supply the Use of Manure, yet to have the greatest Advantage, both must be used together.

The Farmer has got his Seed of the right Rota Kind, and he has fixed upon the Piece of Ground where he will sow it; the next Thing then is to prepare for its Reception.

The great Points here are two. To break the Earth very fine, for the Roots of Flax are small; and to keep down Weeds.

We suppose the Piece of Land to be new broke up for Flax, and in this Case it is to be wrought over several Times, to reduce it to the
needful

needful Fineness, it will be worth while to bestow good Pains upon it for this Crop; and the Flax will never thrive so well as if it be sown on Land laid as Level as the Border in a Garden.

Let the Ground have the last working about the third Week in MARCH, and then let the Seed be sown. This is an Article which we shall consider separately, as there are two distinct Ways of doing it, that by the Drill and the common Way by Hand; and on the former we shall be more particular, because we have Experience upon a Trial, which perhaps no others have made in this Kind. We wish to shew with Impartiality, all the Advantages of the new Husbandry, and although more has been said of it than is true, this Species affords us one, and that very considerable.



C H A P. XXV.

Of the sowing of Flax.

THOSE who have written of the sowing of Flax all mention the doing it by Hand, for there are none who name this Species that have written since the Horsehoeing and Drill Husbandry have been brought into Use. We have Proof that Flax is to be raised in very good Crops by the common Method, but Experience shews that it may be raised much better the other Way.

The great Damage done to Flax in its Growth is by Weeds; and these can no Way be destroyed so perfectly as by the Horsehoeing Method. The Reason that Weeds do so much Damage to Flax is, that in its first Shoot it is for some time very weak. In the common Methods of Husbandry the Weeds rise with it, and they being strong and the Flax weak, they get the better of it; rob it of its Nourishment, stunt it in its Growth, and it never recovers. This the Persons who raise Flax very well know, but they do not know how to prevent it: they have tried many Methods, but some of them have been fruitless, others prejudicial. It is for this Reason we recommend the Horsehoeing Method for Flax, the Success of which we have proved by Trial.

However, as some may be bigotted to the old Way, we shall lay down the needful Directions for doing it in the best Manner, according to that Practice; and afterwards proceed to the other.

If the Farmer chuses to raise Flax according to the old Method of Husbandry, he must lay his Ground flat and even, with all the Clods broke; and the whole fine like a Garden Border; then he must see his Seed sown by Hand, in the most careful Manner, by single Cast. This done he is to go over the Land lightly, with a Couple of fine Harrows joined together, and having thus covered the Seed he is to leave the rest to Nature. The Time of sowing Flax is the last Week in MARCH, but if the Weather be cold it may be deferred till the Beginning of APRIL. The Flax will be sure to ripen for Use if sown in the

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Middle of APRIL, but unless it be got into the Ground early, the Seed does not ripen to so good Perfection.

We have said when the Farmer has let his Seed into the Ground, and covered it with the Harrow, he is to leave it to Nature: it is not that the Flax wants no farther Care, but he can do no more for it. There is no Growth that has more Need of proper Management afterwards, but in this Way of raising it there is no doing the Crop that needful Service.

Weeds will grow up among the young Crop; the wetter the Spring the more of them; and we have shewn the Damage they do to Flax, but what is he to do, he cannot get in to hoe them up?

One Practice there is in this Way, which is the turning in of Sheep, but though this may be of Service, it is capable also of doing great Harm; so that it must be done with Caution.

When the Rains of the Spring have filled the Flax with Weeds, some have ventured to send in Weeders, but their Feet do more Harm than their Hands can do Good.

The other Method of turning in Sheep is much better, but the Time must be hit very nicely; if the Flax be too low they will tread it down and destroy it; and if it be grown to some Height, and the Stalk firm, they will break it with lying upon it, and it will never well recover.

These are the Disadvantages of Sheep turned in upon a Growth of Flax, but if the Husbandman can hit the exact Time it will do very well, there is a Length of the Flax at which it will not be in Danger of being trampled in by the Sheep; and at which it will rise again after their lying upon it. This is when 'tis about five Inches high; and if Sheep are turned in upon the Ground then, they will eat up the Grass and Weeds; and the Flax, receiving little or no Damage, will stand the rest of its Time free from its worst Enemies.

This is the Method of managing Flax from the Seed to the full Growth, according to the common Methods of Husbandry, but we see this is hazardous and imperfect: the Seed is sown at Random, and there is great Danger that in destroying the Weeds the Crop itself is hurt. The same Advantages are procured in a cheaper, easier, and more certain Manner by the new Husbandry; and the Method of raising it is this.

The Land is to be prepared in the same Manner for this, as for the other Method; and the Seed is to be sown in treble Rows by the Drill, properly set for that Purpose, leaving the Partitions seven Inches broad between Row and Row, and the Interval between every three and three as small as will admit the Horsehoe or Hoe Plow; for there requires no more Space between than is just sufficient for performing that needful Operation.

In the common Way of sowing by Hand, three Bushels of Seed are usually allowed to an Acre, when it is the fresh Eastern Seed, and all very fine and full, half a Bushel less will do; in the Drill Way one Bushel is enough for an Acre, and the Stalks rise more numerous, and grow tenderer and finer for it.

As soon as the Seed is in the Ground let the Husbandman prepare for hoeing. He is not so much to mind the shooting of the Flax, as the rising of the Weeds; and this is a Season when they will be very speedy and very numerous. The young Crop should have all the Nourishment the Land affords, therefore these are to be destroyed in the very Act of rising. Let the Intervals be turned up with the Hoe Plow upon the first Appearance of any Weeds, and this will answer several excellent Purposes: it will destroy those Weeds, and at the same Time prepare the Earth of the Intervals, to admit the Roots of the Flax freely, and they will be well settled in it in the Midst of their proper Nourishment, before any second Crop of Weeds can rise.

As soon as the Flax has got a little Height, let Hoers be sent in with Hand Hoes to clear away the Partitions; and thus the Growth will have all the Nourishment the Earth can afford for its first Shoot, which will be vastly stronger than it is to be obtained any other Way. By these Means the Flax will get such a Footing in the Ground, before any other Crop of Weeds can rise, that it will be too strong for them. As they would have starved the Flax before, that will now starve such of them as rise in the Partitions, so that it would do without any more hoeing there; however, there is no Harm in repeating it by the Hand Hoe, in those small Spaces; and as to the Intervals the Husbandman is to keep a watchful Eye upon them, and to repeat the Horsehoeing as often as he sees any Parcel of them rise, that would exhaust the Ground, and tend to impoverish the Crop.

These repeated Horsehoeings are so many fresh Dressings of the Ground, so that the Crop has new Benefit every Time. No Growth requires this Assistance so much as Flax, therefore the Horsehoeing Husbandry can never be more proper than for this Species; and the Encrease in Growth will very well pay the Trouble and Expence.

What we can speak from Experience is but in a Tryal, but we have Reason to imagine from that, that if the Crop of the same Quantity of Ground, by the common and new Method were pared, the Profits of that in the latter Way, after all Deductions, would be double.



CHAP. XXVI.

Of the pulling of Flax.

WE have conducted the Farmer, to whom the Culture of this Species is new, from the Choice of his Seed to the full Growth of the Plant, whether he chuse to raise in the common old Method, or by the new. He has nothing to do but to watch its ripening, and to gather it. This however is an Article on which he must bestow a great deal of Attention. There is a peculiar Period at which Flax is fit to be gathered, and this must be watched, and the Opportunity seized as soon as it offers; all before this being wrong, as well as after it. We shall endeavour, as particularly as such a Thing can

admit of a Description, to settle the exact Time.

In the first Place it is to be considered, that the Use of Flax is of a particular Kind. Other Crops are raised for their Seed or their Roots, but this for the Stalk; which is to be manufactured in a singular Manner, and will yield to the Operation better or worse, according to the exact Time at which it was pulled.

In other Kinds the Ripeness of the Seed, or the Bigness of the Root, are the Marks of their being fit for gathering, but in this it is the due Condition of the Stalk. Those Marks are visible and obvious to the Eye; this is the more difficult to be known, and therefore it must be watched the more narrowly.

The Farmer is to consider, that although the greatest Part of his Flax is to be pulled for the Stalk, it is proper to let some stand for Seed.

This makes a different Period of gathering, for if the whole were to stand till the Seed was ripe, it would be of little worth. Therefore let the Owner first set off a Part for standing for Seed, and let this be upon the Edge of his Ground that is best defended from Winds, and where there is most Sun. If there be a Part open to the South, and backed by a good Hedge, this is the Place. Let him mark out by Stakes what Quantity he will have there for Seed, and then watch the rest for ripening, only giving Directions to the Pullers to spare the Seed Parcel. This particular Part is to stand till the Seed Vessel is very dry and ready to open, and the Seeds, upon opening it, are found to be full and firm. This Degree of Ripeness is easy enough known, so there needs no great Care on that Head; but before this he must look narrowly into the other.

It is a very common Practice to spoil the whole Crop for the Sake of the Seed. The Owners acknowledge, that if pulled while the Seed is young, the Flax will be the better, but that the Seed will be good for nothing; they therefore let it stand till the Seed has just begun to ripen, and then pulling it the Seed they say will harden and perfect itself in the drying.

Those who follow this beaten Path must see their Flax out of Flower, before they examine it for gathering: they must then watch when the Heads turn brown, and begin to bend down the Tops of the Twigs whereon they stand, for that is just the Time of pulling this Way; but as the Flax is sure to be much the worse for so long standing upon the Ground, it is much better to set aside a Part only for the Seeds, and pull the rest when it is in its Perfection.

We would fain lead the ENGLISH Raisers of Flax, into this beneficial Way of conducting themselves. We are sensible that our Flax is inferior in its Quality to that of many Parts of EUROPE, where they have no natural Advantages over us for its Growth, but only understand its Management better. The great Article is their pulling it before it is too ripe.

In the East they sow particular Spots with Flax purposely for the Seed, chusing for this Purpose warm Situations and the richest Soils. This is one Reason why their Seed is so fine, their taking such perfect Care in the Productions

of the Seed Plants, and nursing them up purposely and only for it. We confound the two Purposes of sowing together, we will have our Flax ripen its Seed, and yet be fine in the Stalk, which is impossible. Both in the *LEVANT*, and in those Parts of the *LOW COUNTRIES*, and everywhere else in *EUROPE*, *ENGLAND* excepted, when they sow Flax, they have their large Fields raised for the Stalk, and particular Spots for Seed. They can therefore pull their Flax for Use just at the Time when it is fittest, and therefore their Manufacture from it exceeds ours both in Strength and Colour.

Let us here take Example by those other People; there cannot be any Error in following the Steps of those who we see excel us in the same Article. We have not here laid down their Method of raising separate Parcels for Seed on distinct Spots, it is sufficient that our Husbandman so far imitate them, as to set apart a certain Parcel of his common Growth for that Purpose, chusing that which has most Sun and Shelter.

When the two Considerations of Seed and Stalk are thus separated, they will be both better understood and better managed. The Husbandman is to let his Seed Quarter stand its Time; but he must have an Eye upon the other as it rises to flower.

In the common Method of Husbandry the Flax flowers irregularly in the same Field. Some of the Seed having been buried deeper, and some shallower, there has been more or less Time required for their rising; and the same Difference is preserved in their coming to flower: also some of the Seed lying single and at a Distance, and there being Heaps in other Places from this random Method of sowing, that also will make its Share in the Variation; for such as stand single will flower a Week before those which are in Clusters, because of their having more Strength.

From these different Causes a Field of Flax sown by Hand, flowers very irregularly, some Plants sooner, others later; and this is a vast Disadvantage in a Crop which should be pulled at one exact Time, and that Time determined only by the flowering.

This affords one Instance among many, why the Drill Husbandry is much better than the common for the raising of Flax: for in that Method all the Seeds being let in at the same Depth, and disposed with an even Regularity, both the above-mentioned Occasions of the Difference in coming to flower are prevented; and it is a beautiful Sight to look upon a Field of this Growth, raised in this Way, the whole Crop being of the same Form, and the same Height throughout their Growth, and all bursting out into a Celestial Blue together. There is nothing resembles the Brightness and Beauty of such a Crop in Bloom, but a perfect clear Sky in Summer.

This is a very obvious Mark, and this is the Token for gathering. When the Flax is raised singly for the Manufacture, it is to be pulled as soon as ever it is in full Flower, the proper Time is before one Flower falls.

Let the Owner therefore only watch its Bud:

when that bursts let him have his Pullers ready, and as soon as all the Plants are in full Flower, and there appears the first Mark of fading in any of them, let them be sent into the Field. The more there are of them the better, for the Work would be to pull it all in one Day if possible.

This Practice is founded upon the plainest Reason.

The Flax is an annual Plant: the Purpose of Nature is its ripening its Seed, and when this is done it perishes entirely. The Use we make of the Stalk is accidental, in Respect of the Plant's Growth; and we are to seize the Period accordingly.

The Articles of Value in the Flax are the good Colour, and the Firmness of the Threads in the Stalk: now these Threads arrive at their Perfection when the Plant flowers. They have been gradually coming up to it before, and from that Time they are gradually declining from it; therefore that is the Period of Perfection, and at that they must be taken; in all Things when Perfection is attained, the next Step is toward Decay.

While the Flax is growing to its Height, the Threads in the Stalk are green and tender; when it has arrived at its full Growth they are white and firm, and as soon as that Period is elapsed they grow brown and harsh. This Period is very short, and it must be seized, for all depends upon it; and happily for the Owner Nature is not remiss in marking it, if he be not negligent in taking her Instructions. The Time of flowering is the exact Time of this Period. This is a very visible Notice, and let it be taken accordingly.

The Flax always flowers just when it has arrived at its full Stature; it never flowers regularly before, nor except by some Accident defers it longer. Therefore till it is in Flower the Fibres in the Stalk are green and weak; when it is in Bloom they are white and strong; and when it loses the Flower and is ripening the Seed, they become harsh and brown. Whiteness and Strength are the Qualities we require in these Fibres, therefore the Period of flowering is the exact Time whereat the Plant should be gathered.

We see in all Herbs that the Stalks are weak and tender till they flower: they are firm and in their Perfection when the Plant is in flower, and they dry up and grow brittle when the Seed ripens. Flax follows the Course of other annual Plants, and must be therefore pulled when the Flower is just opened, in order to have it in the full Degree of Strength, Colour, and Perfection.

When the Pullers are sent into a Field of Flax, they are to be ordered to be as expeditious as possible in their Work. The Flax roots very lightly, so that the least Touch takes it up, and this is the Reason of the gathering it by Hand in that Manner. As they pull it up they must gather it into Handfuls, and tying these together they must be set up in the Field at Distances one from another. In this Condition they are to stand till they are thoroughly dry: the Sun and Air soon do this perfectly, and they grow firm but not harsh in the drying.

As soon as perfectly dry the Handfuls are to be housed, and they are then ready either for Sale to the Manufacturers, or for the Use of the Owner if he will work them himself, by which he may be very well assured he will get the greatest Profit.



CHAP. XXVII.

Of the working of Flax.

WHEN the Flax has been well dried after the pulling, the next Operation is what is called Rating of it; as to the housing the Bundles, that is a Matter merely of Convenience. If every thing be prepared, and the Husbandman manufacture it himself, he may take it directly from the Field to the Water; if otherwise it is housed, to keep it out of the Way of Harm.

Rating of Flax is steeping it in Water, in order to loosen its Bark or Rind. The thready Part of the Stalk is all that is to be used, and therefore the first Thing to be done is to separate the Rind from it, that not being thready or any Way useful.

Experience shews that the best Manner of doing this is by soaking it in Water, and that is the Rating of Flax: it is done thus. They lay the Bundles in a shallow Pond or Ditch, dug for that Purpose, putting some slight Weight upon them to keep them under the Water, and every other Day they are to be turned.

When they have lain thus six Days they are to be taken out, if the Bark be sufficiently loosened. This is easily known by rubbing one of the Stalks from the Middle of the Bundle between the Fingers: if the Bark part easily they have been rated enough, if not they must lie a Day or two longer, but usually, at that Season of the Year, six Days are sufficient, sometimes it is done in five.

When taken out of the Water the Bundles are to be spread abroad and dried; and they will thus be prepared for the brakeing. This is the second Operation they go through, in order to being prepared for Linnen. This is performed by a particular Instrument made for that Purpose, and called a Brake, it is notched at the End or throughout, according to the various Methods in different Places, and with this the thready Part is separated from the Bark and loosened. The Method is to begin at the Root, and go all the Way up to the Top.

When the Flax has been thoroughly broke by the Brake, it hangs in Threads and scattered Pieces, and it is then ready for the third Operation, which is the swingling. This is a Kind of beating, and is to be performed with an edged Stick, called for that Reason a Swingle. This separates the Fibres more, and it always lays them more regularly, and by this the Flax is prepared for the fourth Operation, which is the beating.

For this Purpose the swingled Flax is laid on a Block, and laboured with a Beetle, or it is put into a Trough, and beat with a Hammer, and

this beating is continued till the whole Substance of it is made soft and pliable.

When the Flax has been sufficiently beat it is fit to be hackled or combed. This is done somewhat in the Manner of combing of Wool, what are used in this Case for Flax being called Hackles.

It is to be worked thoroughly through these, one after another, till all the short Stuff is got out; and all the long and fine Fibres are made smooth, and lie evenly together in Form of so many Threads; in this Condition it is fit to be spun.

This is the whole Process in forming the Stalk of the Flax; gathered at a proper Degree of Maturity, into Thread, and thence into Linnen; the whole is very familiar, and can admit of no Misunderstanding. It were exceedingly to be wished that the Plainness of the Practice, and the great Profits would lead more into the Work.

When any large Work of this Kind is carried on, there need be no grudging of the Expence of Implements; and where less there are various Ways of contriving to save Money. In some Parts of ENGLAND all the Trouble and Charge of beating Flax by Hand is saved, by a particular Structure of their Corn Mills; they make the Axle-tree of the principal Wheel longer than usual, and they place Pins in it, which by the Motion of the Mill raise large Hammers: these beat the Hemp in the Manner of the Hammers used in Fulling Mills. Many other Contrivances in this Way might easily be made, but the first Point is to get People into a Way of setting about the Culture of the Flax.

Those who raise the Flax for the Stalk and Seed both, have a necessary Operation which we have not yet named, because in this Practice we advise, all that is concerned is the Stalk only, the Seed being reserved in Parcels kept for that Purpose. However, that no Information may be wanting for those who raise Flax in their own Way, we shall add the Method of separating the Seed before the Stalks are put to be watered.

This is called ripling, and it is thus done. The Flax being pulled when the Seed begins to be brown, for that is the Time according to this Practice; when the Bundles have stood up seven or eight Days, and are pretty well dried they are to pass through the Ripple; this is a Kind of combing of the Stalks. The Ripples are made of Wood, and have their Teeth so close, that when drawn over the Stalk they stick at the Heads or Seed Vessels, and pull them off.

When this is done the Bundles are to be put into the Water, as has been directed already; and as to these Seeds not being yet altogether dry, they are to be laid by in an airy Room till Spring, when the whole is to be thrashed in the common Way, to separate the Seeds from the Husks.

This Operation, in some Degree, prepares the Stalks for rating: but it is not necessary. According to our Advice no Regard is to be had to the Seed of that Flax that is raised for manufacturing; and therefore the whole Bundles, when they are moderately dried, are to be put into the Water, where the Leaves will fall off about the third Day, and sometimes the Stalks will

will be ready for their first Dressing the Day but one afterwards, and sometimes the very Day after.

The Time of taking them from the Water is one of the critical Points in the managing and manufacturing of Flax, it must therefore be watched accordingly.

When the Bark will part, and the Threads separate, it is fit for taking out, and that Time should not be let slip.

If this happen the third Day there is no Occasion for any more rating, and if it be not in this Condition on the seventh, it must lie longer. We have given the common full Time it is in preparing in this Operation, but the Condition of the Flax is to guide the Workman, not any particular Number of Days of lying.



C H A P. XXVIII.

Of Hemp.

AFTER the Consideration of Flax we are naturally led to that of Hemp, these two Species being raised for the same Purposes of Cloth, though the Flax be the finer. The Culture of the two Plants agrees in many Respects, though in their Form and Nature, excepting that single Article the Threadiness of the Stalk, they differ as much as it is possible for two Plants to do one from another.

Hemp is a large, tall, bushy Plant, of a very rough Aspect and irregular Growth, but sufficiently upright and firm.

We have explained to the Husbandman, under the two former Articles of Hops and Flax, the Construction of Plants in Respect of their Fructification or Production of the Seed. We have shewn that there is a Male Dust which is to impregnate a Female Embryo, or young Rudiment of the Fruit. In Flax, as in most Plants, we have shewn that this Male Dust, and the Female Embryo are lodged in the Bosom of the same Flower; but in Hops the Male Dust grows in a Kind of little Flowers on some Plants, and the Female Embryo or young Rudiment of the Fruit on others. This is the Case with Hemp, as well as with the Hop; and from hence has arisen a Distinction in this Kind into Sexes.

The Husbandman observing that from the same Quantity of Seed there rose two Kinds of Plant, though alike in Leaves and Stalk, the one bearing little dusty Flowers and no Seeds, and the other producing Seeds without any obvious Flowers, called these two Kinds by the Names of Male and Female Hemp.

This was not improper, but they erred strangely in applying the two Names, for they called those Plants which produced Seeds the Male, and the others the Female.

This was so contrary to Nature, that being in all Species the Female which bears the Embryo or young, that the Names have been changed; and are now given to those Plants to which they properly belong, that with only Flowers of this dusty Kind being called Male Hemp, and that which has Seeds Female.

After this general Account of Hemp we may proceed to the Description in common to both, for excepting the Flowers and Seeds, the Difference between one and the other is very small, and may be named occasionally.

Hemp is an Annual Plant. The Root is long, slender, divided into Branches, and full of Fibres. The Stalk is thick, upright, ridged, of a green Colour, and grows six or seven Foot high. The Leaves are very numerous, and are divided in the Manner of Fingers, or in other Words five separate Leaves grow upon each Foot-stalk, spreading like Fingers, they are of a dead green Colour, rough to the Touch, and notched at the Edges: Tho' five is the common Number of these Divisions, it is not without Variation, for some of them have six or seven.

In this both Male and Female agree, but the Difference between them is, that the Male is the lighter and more delicate Plant. The Stalk is small, and it has fewer Branches; and it is tenderer and more hollow.

On the Tops of this Kind grow the dusty Flowers, which are of a whitish Yellow with a Tinge of Green, little and inconsiderable. The other or Female Hemp is more robust, the Stalk thicker and more branched, and instead of these dusty Flowers it bears the Seed.

The Male Hemp is by some distinguished by the Name of Summer Hemp, and the Female by that of Winter Hemp; because the Male comes to its Ripeness a Month or five Weeks sooner than the other, and it yields the finest Thread. The Structure of the several Flowers and Fruit are curious in this Plant, and very worthy Observation.

In the Male the Flower is composed of five little hollow Leaves, pointed at the Ends and growing together at the Bottom, in the which stand five very small Threads, with each an oblong Button at its Top, of a square Figure.

In the Female there is a green Husk of an oblong pointed Shape, which splits open on one Side, and at first contains the Rudiments of the Seed, and afterwards the Seed itself, for it does not fall off as these Parts usually do. In this stands the Rudiment which is very small, and has two long Points rising from it, sharp at the Ends; the Seed follows, and continues shut up closely in the Husk.

This is the Course of Nature in ripening the Seed of this Plant.

Hemp was known to the antient GREEKS and ROMANS. It is a Native of the warmer Climates: but where it grows wild in Abundance, they cultivate it not the less in Fields for Use: for the Stalk never has its Perfection in the wild State. It no where grows so luxuriant wild as in the EAST INDIES, but even there they raise it for Use by a proper Culture.

There is properly but one Kind of Hemp. We have mentioned already the Difference of Male and Female Hemp, but they both arise from the same Seed, therefore they are properly of the same Kind, though they differ by Accidents. There is an Account in Authors of a Plant called Virginian Hemp, which is large, and has Leaves unlike ours, they being single, not fingered, neither does it produce its Seed like it, though the Course

of Nature in it has some Resemblance. This grows in the Salt Meadows of VIRGINIA, and is called by some Acidna. There are also several Kinds of a wild ENGLISH Plant called Bastard Hemp; but this is properly a Sort of dead Nettle, and should be called the dead Nettle with Leaves, like the single Leaves of Hemp, distinguishing the Kinds afterwards, according to their Differences.

These we have thought needful to name, that the enterprising Husbandman might not be led to suppose them so many Kinds of Hemp, or to cultivate them as such. This would be pursuing Curiosity at the Expence of Use, there are only the Male and Female Hemp he is to regard, and these he will always have when he sows Hemp at all, because they both rise from the same Seed. We have already informed him concerning their Distinctions and Use.



C H A P. XXIX.

Of the proper Land for Hemp.

THE Culture of Hemp is one of those neglected Articles within the Province of the Husbandman, by which he who will engage earnestly and judiciously in it, will not fail to make very considerable Advantage. We shall in this, and the succeeding Chapters, lay before him such Directions for the whole Management of his Crop, that he shall not be left to seek in any the least Point; and shall be happy if by spiriting up the Industrious and Ingenious, we can promote a Thing that will be not only useful to themselves, but to their Country. The Importation of Hemp in various Forms, is a Repröach upon the ENGLISH Husbandry, for we are able to raise it as well as any of those from whom we receive it.

In the undertaking this Article of Husbandry, the first Thing to be considered is the Soil. For there is no Growth whatsoever that so perfectly depends upon the Nature of the Land for its Success.

We have Ground enough in ENGLAND that is proper for it; indeed there is no where so much of a right Kind, but let the Husbandman take Care he does not sow it upon a wrong.

Hemp requires a deep, rich, light, and dry Soil. In ENGLAND we have more and finer Loams than in any Country whatever, and these are the Kinds of Land that best answer to this Description. One of our dark dusky Loams in which there is a good deal of Sand, and a large Quantity of pure Mould, will answer beyond any other Soil whatever; we have a great deal of this Land in NORTHAMPTONSHIRE, LINCOLNSHIRE, and BUCKINGHAMSHIRE, and I have observed that it there runs very deep, often two Foot and a half or three Foot, with a good open Loam at the Bottom. This is the best of all Grounds for raising Hemp. It is a Soil that will bear any Crop; but the Farmer will not find any that will bring him a greater Advantage on this Land.

There are Soils that are particularly impro-

per, as well as such as are fitted for this Growth. The most wrong of all are cold Clays: on these Hemp can never thrive; it is a Native of the East, where the Soils are light and dry, it is therefore against Nature to force it here, to live in a cold, tough, and wet Clay.

The Farmers are aware of this, and therefore I cannot say I have seen Hemp any where so planted; but the other Soil, on which it succeeds poorly, is that on which it is too often sown, this is the deep black Mould that lies in low Pastures, and is always wet. This is what we have called, in our first Book, the rotten moorish Soil. The Depth and Richness of this would agree very well with Hemp, but it is always too moist and too cold.

A deep Earth and Freedom for the Roots to pass every Way, is one of the Requisites for Hemp; but Warmth is the other, and this latter is so essential, that it will grow better in a poor Land that is warm, provided it be deep, than in a very rich one that is too cold.

It is for this Reason Sand is so essential an Article in the Soil for Hemp. I have made it an Observation, that I never saw this Plant thrive any where, where there was not Sand in some considerable Quantity in the Ground. I am aware of an Objection that will be made to this Assertion, by those who have seen Hemp cultivated in the lower Parts of NORTHAMPTONSHIRE, but I have seen it there, and have answered so natural, yet groundless, an Objection on the Spot.

The Land on which they raise Hemp in this Part of ENGLAND, is a deep black Mould, which has been of the moory Kind; but by the perfect draining of the adjacent Fens is now left altogether dry and crumbly.

Hemp would not have grown here to any Profit, while the Land was wet, but it succeeds very well in its present State. I have often talked with the Farmers who raise it here, and they have told me there was no Sand in the Ground; to convince them I have only waited for a Shower of Rain, after which the first Eye that is cast upon the Ground shews it in Abundance.

The Truth is, this is the richest Loam in the World, there is a little clayey Matter which holds it very well together, and serves to detain Wet enough to keep it always moist, and yet not enough to chill it: and there is a considerable Quantity of a middling brown Sand: this warms and opens it excellently, but the Body of the Soil being a fine black Mould, that covers both the clayey Particles and the Grains of Sand, till washed off by Rains.

This is a particular Soil, but it is not singular in that Place; I have seen it in LINCOLNSHIRE, WARWICKSHIRE, and LEICESTERSHIRE, wherever it is the Farmer may be assured, if he will sow Hemp upon it, he will have a very great Return.

I have seen the Experiment of sowing Hemp on gravelly and stony Lands, and as to the Success, that has depended altogether upon the Condition of the Soil in Depth, and the Degree of stonyness; if it be a deep loamy Earth, with a moderate Quantity of Gravel or Limestone Fragments

ments on the Surface, nothing does better, but if it be gravelly to the Bottom, or the Stones be too large, it will not succeed.

CHAP. XXX.

Of preparing Land for Hemp.

A Field may be put in order for Hemp, either by breaking it up fresh, or by manuring it after other Crops, but the former is the better Way.

In NORTHAMPTONSHIRE they commonly break up Pasture Ground, when they have Opportunities for it; and in some of the Counties where they have got into the Method of raising the artificial Grasses, they break up an old Lay of one of them, and it always answers very well. Once I saw a Piece of Woodland first sown with Hemp, after the stubbing up the Roots, and moderately speaking, the Crop was twice as large as I ever saw it on any other Piece of Ground: the Soil was very proper, deep, and loamy, and it had lain in Wood many Years.

Whatever Ground be chosen it will require to be very well dressed, to prepare for this Growth: not that Dung is so proper, for Hemp does not succeed well upon it; but a right Degree of Tillage.

This recommends the Horsehoeing Husbandry, as for Flax so also for Hemp, before all others, because that gives the necessary Dressings by Tillage, and omits either altogether or in great Part the Use of Dung.

When any Manure is used to a Field designed for Hemp, it will be better to chuse some other Kind of the several that we have mentioned in our second Book, and not Dung, since Hemp does not affect that. It will be better to improve the Soil by the lasting, than by these temporary Additions.

From what has been said it will be easily seen, that Land which has been bearing other Crops is not so proper for Hemp, as such as is fresh. Hemp requires a great deal of Nourishment; and these Fields are exhausted by the Crops they have borne: then there is no Way in the common Practice to recruit these but by Dung, and that Hemp dislikes. Therefore the other or fresh Lands are better: but though the best they are not the only ones that will do. I write in these Things from Experience and Observation. I have told the Farmer what I have seen, I shall add what I have tried. I have made a Piece of Ground that had borne its third Crop in the usual Way, yield a very good Produce of Hemp by only good Tillage, without any Addition of Manure whatsoever. Therefore it is speaking from Experience as well as Reason, to recommend the Horsehoeing Husbandry for Hemp. Let the Farmer take Care that his Soil be proper, and he may raise this valuable Commodity upon it at any Time, or in any Condition, only by a sufficient Tillage.

This Assertion is founded upon Fact, and that cannot mislead any; and it is the greatest Proof I know of the Truth of those Principles on which the Practice of Horsehoeing has been established.

Hemp requires a great deal of Nourishment, yet it will thrive very well upon Land so exhausted by its third Crop, that it would have yielded nothing else to any Profit without a Refreshment of Manure, there being no Manure at all added for the Hemp, but the whole being done by Tillage only.

This is a Proof that Tillage alone does prepare the Earth to yield Nourishment to Plants; for the Hemp thriving shews that it has Nourishment in Abundance. And there has been, in this Instance, nothing but the Tillage to give it.

As to the Practical Directions for a Choice of Land, they may be collected from what we have laid down already. We shew here that any Condition of the Land will be made to do, with proper Management; but the best is such as has been covered with Wood; the next best is such as is fresh broke up, whether from natural or artificial Grasses: the least favourable of all is that which has been exhausted by other Crops; but this may be made to answer.

Upon this Distinction depends the Management of the Land, which is the proper Business of this Chapter: but could not be thoroughly understood without first settling these Distinctions. We would have the Farmer in all Cases know not only what he is to do, but why he is to do it.

Thus in the present Case, if the Land on which he intends to raise Hemp be new broke up, whether from Wood or from natural or artificial Grasses, all he has to do is to break it sufficiently fine, and expose it a little to the Sun and Air; and then going over it once again to level it, and then get in his Seed; but if it be a Field that has borne other Crops, and is exhausted, he is to refresh it, not by Dung but by substantial Manures according to its Kind, as with Mud, Sand, or the like; and to break and divide it by repeated Tillage, in order to enrich it. In this Case, the oftener he goes over the Ground the better, and the more Variety of Instruments he uses the richer he will make it. Let him turn it up deep with a proper Plow, and tear it to Pieces afterwards with a Harrow. Then, in a dry Season, let him draw a heavy Roller over it, to crush the Clods; and when he has done this harrow it again, to break thoroughly to Pieces what the Roller only bruised.

After this let him give it Rest for some time, that the Sun and Air may penetrate it well, and then begin by plowing again.

Let this Practice be observed throughout the Winter, and in Spring let him lay it level and even for his Seed.

CHAP. XXXI.

Of the sowing of Hemp.

THE Land we understand now to be well prepared, whether rich in its own Nature or made so by Tillage. We suppose the Winter Dressings to be past, and are now got into Spring, that is the Season for sowing this valuable Crop.

First let the Farmer take Care that he get good

good Seed : if he commit any Error in this Respect, all the rest of his Labour will be fruitless. Let him chuse such Seed as is fresh, firm, and bright; and then try it by rubbing it well between his Hands; if it bear this without breaking, and look the finer and cleaner for it 'tis good, but if it appear dusty, and in Part broken by this it is old and damaged.

Good Seed being thus chosen, the Quantity is to be determined, according to the Method proposed for raising it. If by the common Husbandry three Bushels are to be allowed to every Acre: if the Drill and Horschoeing be followed, which is much best, a Bushel and half of Seed to every Acre is sufficient.

The Seed being ready and the Ground dressed for bearing the Crop, the last Operation performed upon it must be the preparing it for the Seed; and this, whichever Method of Husbandry is chosen, must be very carefully done.

If the common Practice be followed, the Farmer must go over the Ground with the nicest Care. The first Week in APRIL is the right Time for sowing Hemp, therefore let him begin his last Dressing accordingly. If the Season be unfavourable, the sowing may be deferred a Week, ten Days, or even a Fortnight without Damage, but 'tis best when it can be done at the Time just named.

When the Farmer gives the Land this last Dressing, he must make it fine and level as the Border of a Garden; Hemp Seed is tender, it will not grow unless laid in very regularly. It requires but a slight Covering, and if it be laid in deeper it will never come up. If any Clods be left in the Ground they will fall over some of the Seeds, and such will be sure to perish. I have seen the bad Effects of Carelessness in this Article, and therefore caution the Farmer the more strictly; he may depend upon this, that in the common Way of sowing not a third of his Plants would come up; and one half of those that do will rise irregularly, and getting bad Habits by twisting in their first Shooting, will never come to any thing considerable afterwards.

When the Land is of a sufficient Fineness let a careful Seedsman go over it, with the just named Proportion of Seed to every Acre, and let him spread it regularly over the whole Ground, by single Cast, as evenly and equally as he can.

As soon as this is done let the Field be harrowed over very lightly, and then left to Nature: only with this Caution, that it be well defended from Birds.

There is no Seed of which the generality of small Birds are so fond as Hemp Seed: it is a large and conspicuous Seed, so that it attracts their Eye, and it is to be slightly covered, so that they can easily get at it: therefore Boys must be set to watch, and all imaginable Care taken of it for several Days after sowing, otherwise the Farmer, with all his former Cautions, will have but a poor Account of it.

This is the Method of sowing Hemp in the common Way of Husbandry; and to what has been laid down already we have only one Caution to add, which is, that the Farmer who expects a good Crop do not follow the Practice of those who do nothing to their Land till they are just

going to sow it. There are those who content themselves with giving it one plowing in Spring for Hemp, and no more; but by what I have seen they content themselves also with a poor Harvest. Hemp in its Nature requires a Land better dressed than almost any other Seed.

We have given the Method of raising Hemp according to the common Practice, we are to name the Way of doing it in the Horschoeing Method, which we have before observed is vastly preferable. To this Purpose the Preparation of the Ground must be the same, as in the other Method, and the Seed is to be planted in double Rows, with ten Inch Partitions, and with Intervals just broad enough for the Passage of the Hoe Plow.

We have given Directions at large upon the Manner of sowing in this Method of Husbandry, therefore need not repeat those general Instructions under every particular Article; only let the Farmer observe, that Hemp Seed must be planted very shallow; and therefore set his Drill accordingly.

Hemp is a large Plant, therefore it must not be planted in treble Rows, for the middle one wanting Air and Space for its small Roots, would come to nothing. It succeeds very well in a single Row; but Experience shews, that in the double, with this Interval, the Plants grow as well, and the Profit is much larger. This is the Method of cultivating Hemp to the greatest Advantage, and with the greatest Certainty of Success.

XX

CHAP. XXXII.

Of the ordering Hemp in its Growth.

IT is the Advantage of the Horschoeing Husbandry, that it supplies Plants continually with fresh Quantities of Nourishment during their Growth. This is not more necessary for any thing than for Hemp, for the filling of the Stalk depends very much upon it. 'Tis for this Reason that we have so particularly recommended the new Husbandry for this Species. A Plant raised this Way will be often worth four in the common Method.

In that Practice the Hemp is to be left altogether to itself, as soon as it is well out of the Ground. The Attendance is only required till the Body of the Seed is wasted. Birds will not meddle with it afterwards, and as to Weeds they cannot live among it. 'Tis a quick Grower, and a very strong Plant; and in the Way of sowing by the common Method, the Shoots will rise so near one another, that they will have enough to do to live well themselves, till they begin to pierce with their Roots to some Depth; and neither then nor afterwards, will they suffer any thing else to live among them.

Hemp is so far from being in Danger from these, that it is the best Thing that can be sown for preventing them for the future. Nothing clears a Land so thoroughly from Weeds as a Crop of Hemp; but then it exhausts the Land so thoroughly, that it leaves it fit for little else without a great deal of Preparation.

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We have said the two great Advantages of the Horsehoeing Husbandry, are the destroying Weeds and furnishing the Crop with Nourishment while growing. For the first Purpose Hemp we see does not need its Assistance; but nothing requires it more for the latter. If Hemp satisfies the Farmer in the common Way; it will enrich him in this, for every Plant will speak for itself in the Praise of this Method of Culture.

When the Seed is let in by the Drill the Danger is not so great from Birds and other Vermin, as when scattered in the common Way, because though covered but at a small Depth, still it is all covered; but this, though some Help is not a sufficient Security, one Seed that shall chance to lie naked will tempt these Devourers; therefore it is to be watched in the same Manner as when let in in the common Way of sowing. The Time of the Birds feeding upon the Seeds is principally before Sunrise, therefore the Ground must be carefully watched from Peep of Day: after this they are less ravenous, till toward Evening, when they feed again, till within half an Hour of Sunset.

We don't mean by this that they need not be watched at other Times, but these are the Hours wherein they require the most strict Care.

When the Hemp has got four or five Inches Height in the Shoot, the Weeds will begin to fill the Intervals; and some, though not many, will rise in the Partitions between the two Rows. Let the Farmer send in careful Labourers with Hand Hoes, to cut down those that have risen in the Partitions; once doing this will be sufficient, for the Hemp gathering Strength will not permit them to get up any more.

These Hoers should be ordered also to pull up here and there a Plant of the Hemp, where they have risen too thick: but this is an Article of his Employment in which he must be sparing, for the working of the Intervals between, will render the Ground capable of supporting the two Rows of Hemp, with the Plants closer than can be well imagined.

When the Weeds are cut down by Hand in the Partitions, let the Horse Hoe be brought into the Intervals, and with this let all the Ground between the Pairs of Rows be turned up deep, and broke very fine. The Weeds will be destroyed by this, which were too far off the Plants of Hemp to be starved by them; and the whole Soil will be made fit to receive the Roots of the Hemp, and filled with Nourishment to support them.

The Effect of the Horsehoeing is in no Case seen more perfectly or plainly, than this Instance. The Fibres of the Roots of Hemp, even in the most favourable Soil, do not naturally spread, for they lie in Clusters about the Base of the Stalk, their Number answering for their Shortness. But in this Way of Horsehoeing the Fibres of the two opposite Rows will meet across a five Foot Interval very visibly, and fill all the Space between; this is plain to the Eye in examining the Roots, and the flourishing State of the Plant confirms it.

The Horsehoeing must be repeated as often as the Weeds get up in these large Intervals; for no more, after the first, will rise in the Parti-

tions; and in this Manner the Ground will be every now and then cleared and enriched, till the Time of pulling the Crop. It will be filled with Nourishment by the Work, and all that Nourishment will come to the Crop.



C H A P. XXXIII.

Of the pulling of Hemp.

WE have brought our Hemp from the Seed Time to its full Maturity. The Summer has been left for its Growth, and we suppose we are now arrived at Lammas Time, which is the Season of the first Hemp Harvest. We say the first, for there are two Gatherings of this Plant in every Ground: the Male and Female Hemp, which always rise together from the same Seed, differing, as we have observed, in the Time of ripening.

This makes a very particular Article in the Management of Hemp, and a particular Caution is to be given the Husbandman not accustomed to this Crop, about it.

We have mentioned the Season of the Male Hemp, which is called also the Summer Hemp, and by some fimple Hemp, ripening. At this Time let him keep his Eye upon the Field, and observe when he sees the Leaves beginning to hang and turn yellow. He will see this when once it has begun, spread quickly through the Field, but only upon the Male Plants. About the Time of the Leaves drooping and growing yellow, the Stalks turn whitish, and this is the Signal for gathering, no farther Care is needful. This Kind bears no Seed, so that there is no second Consideration as there is in the other.

When the Male Hemp has got into this Condition, the Pullers are to be sent into the Field to get it up. Hemp is gathered like Flax, by tearing up by the Roots, and therefore the gathering of these is called pulling. But here there is a great Difficulty. The Flax is easily enough pulled up, because it is all to be pulled up; but in the Hemp it is only a Part; and it is not easy to do this without damaging the Remainder, a careless Conduct in the gathering this Part of the Crop might easily spoil the other.

When Hemp has been sown in the common Method, all the Owner can do is to caution his Pullers that they do not trample down, break, or otherwise injure the Female Hemp that is left standing; but with his best Instructions, and their best Care, there never fails to be a great deal of Mischief done. Therefore in this Respect, the raising Hemp by the Drill and Horsehoeing Husbandry, in the Method of double Rows as we have advised, has a vast Advantage. In this Way the Intervals between two and two Rows are so wide, that the Pullers can easily and freely get in between them; they can take up the Male Hemp without the least Damage to the Female, and they have Room to manage it and get it up into Bundles. All this which is so very easy in the new Way of raising the Crop, is subject to the greatest Difficulty and Disadvantage in the old.

The first Pulling being thus over, the remainder

mainder of the Growth is to stand till MICHAELMAS. It thrives the better and the faster a great deal in either Way of the managing, because of being thus thinned; and the Time of gathering it coming in late, after the other Harvest Work is over, is very happy for an industrious Poor, in the Places where it is propagated.

The gathering of the Male and Female Hemp is to be done in the same Manner, except that there is to be a Difference in the making up of the Bundles. Each Kind is to be bundled up as the Flax, but the Male Hemp is to be gathered into small, and the other into large ones. The Male Hemp should be gathered up into such Bundles as may be grasped with both Hands, but the Female Hemp is usually got up into such as are a Yard round. This is all the Difference in respect of gathering.

C H A P. XXXIV.

Of the drying of Hemp.

IN the Hemp of the first gathering nothing is to be minded but the drying it in a proper Manner, to fit it for farther working; but in the Female Regard is to be had to the Seed.

The Time of making the second gathering is, for this Reason, determined by the ripening of the Seed on the Plants; and when gathered and bundled, these Bundles are to be set up in the Sun four or five Days, and then stacked up, that at a proper Time the Seed may be thrashed out before they are fitted for farther Manufacture. It is the common Practice to raise this Hemp in Stacks, in some sheltered Part of the Field, but as the Beginning of OCTOBER is usually a dripping Season it is better to house it. A little Wet does it no Harm as to the main Article of the Stalk, but it may very easily get Damage in Respect of the Seed; and as the housing it is easy 'tis much better to do it; the Owner then taking his own Time to thrash it.

The Caution we have given the Farmer about ordering Care to be taken that the Hemp that is to remain for the second gathering, be not hurt in the first, will be easily seen to be worth his most serious Consideration, when he comes to thrashing his Female Hemp. From the Produce of an Acre of good Land he will get three Quarter of Seed, if he have followed the common Husbandry in raising it; but if he have done it in the Horsehoeing Manner he will have four or five Quarters, sometimes more; the Plants in that Way branching out more, and bearing a much larger Quantity of Seed, and also ripening it better.

This, which is but an additional Consideration, sets the Female Hemp a great deal above the Male in Value, and at the same Time the Stalk of Hemp itself is much more valuable in the Female than in the Male.

C H A P. XXXV.

Of the watering of Hemp.

WHEN the Male Hemp is gathered nothing is to be done but drying it a little, before it is carried to the Water; to this Purpose the common Practice is to bundle it up at once, as it is pulled, and set the Bundles up on End till the Moisture is somewhat evaporated.

This is all that can be conveniently done in the common Way of Husbandry, because there is no Ground for spreading it; but in the Horsehoeing Method, as there is Space between two and two of the Rows, it is best to throw it upon the Ground as it is pulled, and there let it lye a Day and Night; and after that to gather it up into Bundles.

This may be practised for the Female Hemp, in the common Way of Husbandry. It is not an Article of any great Consequence, but it is best to do it in both.

The Male Hemp; as soon as it is a little dried from the gathering, and the Female, after the thrashing, are to be carried to the Water in their proper sized Bundles. For this Purpose a large shallow Pond is best, and it should have a firm Bottom: running Water would answer best, but it is not permitted any where to use it, for the Hemp infects it, destroys the Fish, and spoils every thing that is done with it.

Let the Farmer therefore who is raising Hemp take Care to have a Pond of proper Depth and Dimensions ready, according to the Quantity of his Hemp.

He is to prepare for the Hemp by driving in half a dozen Stakes in a square Form, very firmly into the Bottom. There the Hemp is to be brought and laid in, keeping it under Water; and the small Ends of the Bundles are to be placed interchangeably, the thick Ends of one Bundle being laid one Way, and the thick Ends of the next another, and so with the whole Parcel.

In this Manner the Bundles are to be laid in one upon another, and the Water is to cover them all.

When the Bundles are all in there are to be Over-layers, as they call them, of Wood bound to the Stakes, to press them down, and keep them not only under the Water, but fixed from stirring about. Some cover the Square within the Stakes entirely with Over-layers of Wood; others only cover the Edges with these, throwing great Stones or other heavy Rubbish, to keep all under Water. Whichever Way the Hemp is kept constantly under, 'tis all one.

When it has lain thus five Days, one of the upper Bundles is to be taken out and washed in another Part of the Pond. In this washing the Farmer is to observe whether the Leaf comes freely off, for if it does the Hemp is watered enough; if not it must lie longer.

When it is watered enough the Bundles are to be taken out one by one; and washed in other Parts of the Pond, that all the Leaves may be got off, and any Filth or other Matter that may by Accident be got among them, may be

be discharged. This done the Business for watering and washing is over, the clean Stalks are to be set up an End, that the Wet may drain from them. When they are thus pretty well drained from the Water that hung about them, they are to be carried to some Place where they can be set up against a Wall or Pales, exposed to the South Sun, that they may thoroughly dry. This prepares it for the next Operation.



C H A P. XXXVI.

Of the brakeing of Hemp.

WHEN the Hemp has been cleared from Leaves and Filth, and dried from the washing, it is ready for the Brake. This is a wooden Instrument made with an Edge, and in all Respects like that used for Flax before described, but that it is larger and stronger. This is the Case with all the Instruments used in dressing of Hemp, they are the same in their Nature as well as Uses, with those employed in the dressing of Flax; but as this is a coarser Matter, they are larger, coarser, and stronger.

The Effect of this Dressing is, that the Bark or Rind of the Hemp is separated from the stringy Part of the Stalk, and that is broke and prepared for farther manufacturing.

The thorough drying of the Hemp is altogether necessary to the doing of this well, for otherwise the Bark will not separate, nor the Threads come to Pieces; and the Dryness of the Weather is a great Advantage in the same Respect, wherefore this should never be set about but in a favourable Time.

If the Season have been dripping, and the Hemp could not be got thoroughly dry by the Method already directed, it must be done by the Assistance of Fire: but there is great Caution necessary in this Respect, the Hemp so easily takes Fire in the drying. So many Accidents of this Kind have happened, in Places where Hemp dressing is carried on, that every one ought to be vastly upon his Guard who ventures on it; and if possible the Hemp should be dried without having Recourse to this dangerous Expedient.

In some Places they raise a Kind of Frame for this Purpose, which answers very well. They drive Stakes into the Ground at proper Distances, and lay Hurdles over them at five Feet from the Ground: they then spread the Hemp thin upon these Hurdles, and make a small Fire underneath. This requires good watching, but as a little Heat does for the Hemp it may be conducted without Danger. The Expence is trifling and it makes it work much the easier.

The Method of brakeing is the same in Hemp as in Flax, and the Purpose is also the same, the preparing it for farther dividing. It must be begun at the Root End, and so broke up to the Top; and the Person who brakes it must look into his Work at Times; the Design of brakeing it is, that the stringy Part of the Stalk may be all thoroughly crushed and loosened, when this is done, and it hangs in Shivers, it is

enough; if otherwise it is to be broke more. Let not this be slighted: the whole Management of Hemp is very easy, but it must be conducted with Care; for a Mistake in this Respect can never be mended afterwards, without the greatest Difficulty, and often not without a great deal of Waste and Loss.



C H A P. XXXVII.

Of the dressing of Hemp.

IT would be natural to count the brakeing among the other Articles, in the manufacturing of Hemp under the common Head of dressing; but Custom establishes it otherwise, and we follow the usual Manner of speaking.

The brakeing of the Hemp being over, the next Operation is the swingling. As to the Article of brakeing, some perform it at once, which is the better Way, others go over it twice, this takes up Time, and with good Management is not needful. When the Hemp goes through this Operation twice the Brakes are of two Kinds, one coarser the other finer, and it is first broke in the one then in the other; but if a Brake of a middling Degree of Fineness be carefully used, once does it, and it will be fit for the Swingle without any more Trouble.

The swingling of Hemp, which is the first dressing after the Brake, is performed by two Instruments, a Block and a Dagger.

The Block is made of a single Deal raised four Foot above the Floor, and supported strongly to keep it steady; the Dagger is a wooden one, of the Form of a broad large Dagger, with a blunt Edge.

With this Dagger the Hemp is worked upon the Block, opening and beating it till all the knotty Pieces and Shivers are entirely broke, and the whole is perfectly smooth and even.

The Parcel of Hemp brought to the Brake together, is called a Strike: this they also bring to the Swingle together, and when they have sufficiently wrought it they strike a Fold or Twist in the Middle, which is the thickest Part, and so lay it by, proceeding with the rest till the whole Parcel is done.

This swingling is a very useful Operation, and it must be done carefully: the more so because it prepares the Commodity at once for the Market, if the Owner chuses to part with it in that Condition. For this Purpose he should observe, that there are two Things to be done in the swingling, the one is the breaking out the Lumps and Shivers, and the other is the softening of the thready Part, which is very well effected by the swingling, provided that be done carefully.

If the Owner chuse to part with his Hemp in the State just named, he has no more to do but carry it to Market; but he may more profitably prepare it farther. Every succeeding Operation is a getting it more and more ready for Cloth. The next to what we have already named, is a second swingling. This is done exactly in the same Manner as the first, and this works it still finer. The first swingling beat away the Lumps and softened the Teares, this second divides

vides the Threads finer, lays them smoother, and prepares it for heckling.

When the second swingling is over, the Strikes are to be divided into Dozens and half Dozens, and so made up into great thick Rolls. These are to be spitted upon long Sticks, and hung up in the Chimney, or in the Way of some other gentle Warmth. They must be dried in this Manner till there does not remain the least Damp or Moisture in them; and they are then fit for beating. This is to be done in a deep and strong Trough, or upon a Block hollowed at the Top, and the Beetles must be large and heavy. By this Operation all the Threads are rendered fine, clean and tough.

When this is done the Stakes are to be divided, and all examined, to see if the whole be beaten enough; frequently some are not, and these must be beaten again.

When the Hemp has been thus twice swingled, carefully dried, and well beaten, it is to be brought to the Heckle. But this first Heckle must be coarse, and with very open Teeth.

From this heckling there will come some coarse Parts, which neither the swingling separated nor the beating subdued, these are to be laid aside, and the Hemp that has gone through this first coarse Heckle is then to be worked in one that is finer. This prepares it for working into Cloth in the usual Way: but when it is designed for Linnen of particular Fineness, there is some Difference to be made in the Management; and this may be worth the Farmer's Notice, whether he intend to work it into Cloth at Home, or design it only for Sale in the Strike or heckled State.

Two Dryings are very convenient on this Occasion, that is, when it has been dried and beat, and once heckled, it is to be rolled up and dried over again, and the beating and heckling repeated in the same Manner, and after this the Heckles designed for Flax are to be used instead of those for Hemp; these being coarser and not so fit for the fine Work, even in Hemp, as those intended for Flax.

This is the Management and Preparation of Hemp, from the sowing the Seed to preparing it for spinning. The Owner may sell it in the coarser or finer Condition, but he will find it most profitable to continue the Dressing, in the Manner we have directed, to the spinning.

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#### C H A P. XXXVIII.

##### *Of the managing the Hurds.*

**W**E have mentioned occasionally more than once, the separating the coarser Part of the Hemp in dressing and rendering it finer. This coarse and knotty Part thus separated, is called the Hurds, it is not to be wasted; but being laid aside in the dressing of the other, is afterwards to be managed by itself.

To be properly understood on this Head we must refer to some of the former Articles.

In the first swingling of the Hemp there will be separated from the finer Part a great Quantity of Refuse, with Tops, Knobs, and half broken

Pieces and Lumps. All these must be shook up together, and carefully dried. When this is done they are to be thrashed with Flails, and by this Means the Lumps will be broken, and they are to be laid by; they serve for many coarse Purposes, though they would never have broke or divided well with the finer Stuff. These, by Way of Distinction, are called the Swingle-tree Hurds; though any of the Refuse may be beat up among them: a great Care of the Owner being, that nothing which can be put to any Use be wasted.

When the Farmer pursues his Interest by dressing the Hemp farther, there will be more Hurds separated in the second swingling, and they will be of a better Kind; these, managed by the Wool Cards, make what is called Hempen Harden. They are not to be mixed with the other Hurds; for they are much better, and sell at a more advantageous Price.

In the same Manner every succeeding Operation for the dressing the Hemp separates a Quantity of Hurds, though it be every time smaller and smaller. These are all to be laid by as they come out. They do not require thrashing with Flails, in the Manner of the coarse first Hurds and Refuse; but being well managed with the Cards, they make so many Sorts of saleable Stuff at different Prices.

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C H A P. XXXIX.

Of Woad.

WOAD is a Plant of easy Culture, and as easy Management; subject to few Accidents, and of a ready Sale. 'Tis pity that it should be cultivated in so few Places. One Recommendation it has in which it exceeds any Growth, this is, that it yields three, four, five, and sometimes six Crops in a Year.

It is a large Plant, with great blueish green Leaves, branched Stalks, and Multitudes of small Flowers, followed by little Pods with the Seed.

The Root is long and covered with Fibres. The Stalks are thick, round, and upright, and they divide at some Height from the Ground into several Branches.

The Leaves stand irregularly upon them; and many very large ones rise directly from the Root.

The Flowers are of the Shape of those of Turnips, and the Seed is oval.

The Flower is placed in a little Cup, consisting of four oval coloured Leaves: it consists in like Manner of four Leaves disposed crosswise. There rise in the Middle six Filaments, four of these are of the Length of the Leaves of the Flower, and two are shorter; they have oblong Buttons on them, placed Sideways, in the Center of these stand the Rudiment of the Fruit. It is oblong, sharp on both Sides, and is no higher than the two short Filaments; the Flower and its Cup falling off this ripens, and contains only one Seed, which is lodged in the Center.

There are several Kinds of this Plant brought for Curiosity out of different Parts of the World, but only one is worth the Farmer's Notice, this is the common or broad leaved Woad, called Field

Field Woad. There is a Kind with smaller and narrower Leaves, distinguished by the Name of Wild Woad, but it differs little from the other. The Seed of this is sometimes, by Design or Accident, mixed with that of the right Sort, and of this the Farmer should beware; the only Difference is, that this Seed is somewhat smaller than the right. It brings up a very good Woad, but not equal to the other.



CHAP. XL.

Of the proper Soil for Woad.

THE Farmer is not to be tempted by the Advantage attending any Crop, to engage in the raising it, if he have not the proper Requisites; and the very first of these is a proper Soil.

There are Plants that will succeed only in some one Kind, but Woad gives him his Choice of two or three: it must be sown however on one or other of these, or it will never answer. Therefore, though he has this Liberty, let him see that he does not exceed it. The two Articles in a Soil that favour the Growth of Woad are, that it be dry, and that it be rich. When these happen together the Soil is perfect for the Plant; but separately they will do. Any warm and dry Soil will do, though it be but poor, but the better the richer; and in a rich Soil Woad will do, tho' not so perfectly dry as it must be in the other.

What this Plant affects most is a rich warm Loam; but as Richness and Dryness are what favour it, Cold and Wet together will never fail to destroy it.

Clayey Soils will never do. This is to be the great Caution; and the next is, that be the Soil what it will, the Woad will not succeed upon it unless very deep, if there be a clayey Bottom. This depends upon the same Principle with the other, the Hatred there is in this Plant to Cold and Wet; for Clay holds Wet and always makes a Soil cold when it lies near the Surface.

Now from these general Hints the Farmer may very well settle his Practice in all the needful Particulars. First let him avoid all Clays and clayey Soils for Woad, and next, when he is about to sow it on any other, let him examine the Depth and the Bottom.

Woad is a large Plant and requires a great deal of Nourishment, therefore it must have Quantity, that is, Depth of Soil, at any Rate; and particularly it must when there is a wrong Substance underneath.

These are the Cautions as to what he is to avoid, the next Consideration is what he is to chuse.

If he have a sandy Soil that is not bare and poor, but enriched with a large Quantity of good Mould among it; this is excellent, and the deeper the better. If he have a Piece of Ground that has a Soil of pure mellow Earth to a due Depth, this is better still; and in particular if he have Opportunity of breaking up a Piece of Ground near some great Town, where there has been a Garden, this is very proper.

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It is worth his while to be careful in this Choice, because the Profits will answer accordingly. For on favourable Ground he will have one or perhaps two more Crops in a Year, than on such as is but moderately right.

Woad, like all other Plants which require a great deal of Nourishment, succeeds best of all upon a Piece of Ground that is new broken up for it; and in this Case none answers like that which has once been in the Garden Way, and which has been mellowed by Dung and great Tillage.

If there be a Piece of gravelly Ground where there is not too great Abundance of large Pebbles, and a good deal of Loam among them, this will do excellently. I have seen Woad thrive very finely, where it has seemed to grow among bare Pebbles; but there has been good Stuff at the Bottom.

Any Piece of light Limestone Ground will also do for Woad, with the foregoing Restrictions, that it be not full of very large Pieces of Stone; and that there be some Goodness and some Depth in the Soil.

Of all Places in ENGLAND where I have seen Woad cultivated, the finest has been about THORNEY in NORTHAMPTONSHIRE. I had the Curiosity to examine the Soil in this Part of the Country, in several of their Fields, and found it all of one Kind, it was deep, rich, and of a blackish Colour; it consisted chiefly of mellow Earth, but with a large Proportion of a bright brown Sand.

What is more remarkable than any thing about this particular Soil is, that the Situation was low and subject to Wet. The Woad grows there in the Way of more Moisture than I have ever seen it elsewhere, and yet surpasses all other in the Largeness and Fineness of the Leaf.

This is a particular Case, and I have inserted it as such, for the Sake of the Husbandman who may chance to have Land of the Kind of this about THORNEY, but in general a somewhat hilly Situation is best, and a dry deep Soil.

We have observed that Woad succeeds best of all upon new broke up Land, and the ranker this is the better the Woad will thrive; it serves excellently to prepare such Land as this for Crops of Corn, for which it would otherwise be too rich at first: but on all other Occasions, as well as this, the Woad is to be removed after a Year or two. It exhausts the Ground, and never succeeds well in the same Place long together.

The new Method of Husbandry might remedy that Inconvenience, and perhaps with the Assistance of a moderate Quantity of enriching Manure, the same Piece of Ground might be made to bear Woad ever so long; but this we shall mention more at large hereafter: the common Practice of Husbandmen is what we consider in this Place; and that requires that the Crop should be removed the third Year.

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CHAP.

C H A P. XLI.

Of preparing the Ground for Woad.

WHEN the Farmer has fixed upon a proper Piece of Ground for this Growth, his next Care is to prepare it for the Reception of the Seed; for without this he may, after his best Choice, reap but a poor Advantage.

All Plants that draw a great deal of Nourishment, require that the Soil should be well prepared for giving it. This Preparation is best given it by frequent Tillage; and a careful and repeated breaking and dividing, and occasionally enriching of the Ground. As it requires a great deal of Nourishment, a Piece of rich Pasture Ground new broke up for that Purpose, is better than one in Tilth for Corn, and the Woad will leave it in a very good Condition for any other Crops.

The best Way of preparing such a Piece is, by turning it up first with the four coultered Plow, which we have described before. This will cut and tear all the entangled Roots of the Grass, and turn up the Mould to a very considerable Depth.

After this plowing it should be harrowed carefully, and if the Season and Soil be both dry, it should be then rolled, and afterwards harrowed again.

This being done, the Lumps broke, and Refuse of every Kind drawn off, there should be People sent on the Ground, to pick off the large Stones or any thing else that breaks in upon the Evenness and Fineness of the Ground, and has escaped the Teeth of the Harrow.

This is the Custom in the Land that is most fit for Woad, that is, such as is dry and warm: when it is a little moister the best Way is to plow it in high Ridges, and then the Pieces of Turf, and other Refuse that lie upon the Surface, when picked off, may be thrown into the Furrows to rot.

Whichever Method be followed, the Land when finished for sowing, ought to lie as level, and be as free from Lumps, as the Border of a Garden. Land that has been fallowed some time does very well for Woad; and I have seen it thrive excellently on a broke up Piece of any of the artificial Grasses: but in any of these Cases the Preparation must be exactly the same, and the Reward will be suited to the Labour and the Care.

C H A P. XLII.

Of sowing of Woad.

THE Preparation of Land for this Produce having been shewn, there remains to enquire into the Time and Manner of doing it. In each of these there is sufficient Matter of Choice to the Husbandman, for neither the common Manner of dispersing the Seed, nor the common Time of doing it are so proper as what may be advised.

In the first Place the Farmer is to take Care

that he buy good Seed, and that he have enough of it: he is not to count that Quantity sufficient which will do to sow the Ground he intends for this Purpose. Woad is very apt to fail, or to be destroyed early in its Growth, he must therefore have a Supply of Seed by him, to let in and make up the Deficiencies. Having his Seed and his Land ready, he may sow it in the common Way or by the Drill. In the first Method a Gallon of Seed is enough for an Acre, and in the Drill Method half that Quantity is sufficient, for Woad is large in its Growth, and a few Plants are enough upon the Ground.

In the common Way of sowing, the Seed is to be scattered as evenly as possible over the Ground, by the single Cast, and then harrowed in carefully. In the Drill Husbandry it is to be sown in double Rows, with ten Inch Partitions, and with five Foot Intervals between two and two.

Few Crops are more difficult to be well managed in the common Husbandry; and none easier in the Drill and Horseshoeing Method. The Leaves also grow much larger, and are in themselves much better this Way.

As to the Time the common Farmer errs as much as he does in the Manner of sowing. The common Season for this is the Middle of FEBRUARY, but the proper Time is the first Week in AUGUST. The Woad ripens its Seed in the End of JULY; Part of the Plants are to be reserved for that Purpose; and the Seed never pushes so strongly as when sown as soon as fit for it.

This is the Course of Nature; and it would be well if it were followed in more Things. We see the Seeds of Plants ripening in AUGUST and SEPTEMBER, naturally fall to the Ground at that Time, or soon after, and they shoot in a few Days, their Leaves stand the Winter, and all that Time the Root is strengthening itself in the Earth, so that when the Spring comes they are in a Condition to shoot with Strength and Vigour.

This being observed in Relation to Woad, the Growth will be much sooner fit to cut for the first Crop, and every Way better. This first cutting will be the richer for the Time the Roots have been in the Ground, and the fresh Shoots will be the more vigorous for the next, it will come ten Days or a Fortnight earlier in the same Season than it would have done in the Spring sowing.

There is this farther Consideration, the first Shoots of Woad are very apt to suffer by Insects, in the Manner of Turnips and some others. It is for this Reason we have cautioned the Farmer always to have a Supply of Seed to make up Deficiencies; but it is better to prevent them, and on this Occasion the Autumnal sowing is preferable.

When the Seed fails in some Part, and the Crop is supplied by fresh, this is a little backward than the first sown; and when the Fly has destroyed a Part of the young Crop, and more is sown, this last will be still more backward in its Growth than in the former Instance. The Husbandman would wish it should be all equal, that it might come all to be cut together, but

but this is not to be obtained, unless these Evils be prevented instead of remedied.

This is not, in either Case, to be done without a Possibility of failing, but it may be made greatly more safe and certain by the Autumnal sowing.

I can speak from Experience, that the Seed sown in Spring is, in this Kind, much more subject to fail than that in Autumn; and also that the Fly or Grub, so destructive of the young Growth, is much more frequent in the former than in the latter Season.

As to the Goodness of the Seed, that depends in a great Measure on its being new. Seed sown in FEBRUARY must be seven Months old, and it may be nineteen or twenty Months. And for this it is always the worse in Proportion. It is a common Opinion among the Woadmen that two Year old Seed is as good as fresh, but nothing is more erroneous. They complain of bad Crops, and 'tis strange they do not see into this, which is one principal Cause. I have made some of them try the Experiment, and the Difference has been this, that out of twenty new Seeds sown, not above one, two, or three have failed; and out of as many old ones, eleven, twelve, or more; one would think this should be convincing.

I have found in the same Manner by Tryals, that out of twenty Seeds of the same Crop, sown in a Fortnight after their ripening, only two have failed; and out of twenty sown from the same Parcel, the next FEBRUARY, four or five; this is as convincing an Argument as the other.

These are Facts on which the Husbandman may depend; let him therefore regulate his Business accordingly. Having thus laid down the best Method of sowing this Crop, we shall proceed to inform the Husbandman of the Way of managing it, whatever Practice he may have followed in sowing.

C H A P. XLIII.

Of managing Woad in the Growth.

WE shall here direct the necessary Conduct for every Kind of Crop of Woad. We will suppose then first, that the Farmer have followed the old Method, and sown his Land in FEBRUARY by hand. In this Case he will see it come up irregularly, and when it has been a Week above Ground, he must observe how it stands; if the Grub or Fly have been at Work, he must send in a careful Person with a Dib in his Hand, and a Parcel of Seed in his Apron. With the Dib he is to make Holes, and into each Hole he is to put five Seeds, this is to be done wherever the young Crop is seen to be thinned; and these Holes are to be a Foot asunder.

If the Farmer will sow his Woad in Spring, the earlier he does it the better. This Plant will shoot in very cold Weather, and the earlier the Season the fewer there are of those Insects, the warm Showers of the more advanced Spring bring them on in Abundance.

When the Plants from this new sowing have

got to a little Size, the Field is to be hoed. This is not only to be done to keep down Weeds; but to thin the Crop itself, for the Plants must not stand so close as they rise in this random Way; if they do they will starve one another. The Hoers must be careful Persons; they must have Orders to thin the Plants to about a Foot asunder; and they should leave the strongest and most promising. In this Manner they will be refreshed as well as thinned; and having taken good Root, and the present Crop of Weeds being destroyed, they may be left to themselves, for they will not suffer any more to rise among them. In this Manner they may be left to make their necessary Growth.

In the second Place let us examine the State of a Crop sown the first Week in AUGUST. In this, if the Seed have been the Produce of that Year, and the Ground well prepared for it, there will be little or no Need of examining it on Account of Deficiencies. The Ground will be too well covered to need a Supply; and the Flies will have little Power.

At a proper Growth, as in the former Instance, the Hoers are to be sent in, and they must thin the Plants in the same Manner as the others, and thus leave them for the Winter. In that Time they will make but a moderate Progress above Ground, but they will be all the while strengthening themselves at the Root, which is the Owner's true Interest. They will be just strong enough to keep down the poor Shoots of Weeds, that shew themselves in that cold Season, and they will shoot apace into Leaves in Spring, affording an early Crop, and a very fine one; and leaving the best Foundation that can be for the next, that is, Strength at Heart.

From what I have seen practised by some particular Woadmen, in this common Way, I shall be able to give the ordinary Farmer who pursues it, some useful Hints. If he send in his Hoers again in Spring, to break the Surface of the Ground, and destroy all the Weeds between the Plants, this Practice will greatly strengthen and refresh them. Not so much for the Injury such a few poor starved Weeds could have done, as for the Advantage there is in breaking the Ground.

This superficial hoeing leads us naturally from the common Practice of raising Woad by the old Husbandry, to the Method we have proposed for doing it according to the new, and to the Advantages of deep hoeing about Plants of so large a Growth.

We have advised double Rows and five Foot Intervals, because a third or middle Row would want Air, and therefore its Leaves would never come to their Freshness and Colour; and because the Land between double Rows should have Opportunity of good turning.

We will now suppose a Farmer to have ventured on this Method, and shall not fear to promise him a three-fold Success, to what it was possible he should have obtained by any other. The Method he is to follow in the Management of his Crop is this.

When the Plants in his two Rows have got some Bigness, he must send in the Hoers with their Hand Hoers. These must clear away all the

the Weeds in the Partitions between the two where the Horse Hoe cannot come; and they must thin the Plants in the Rows. They must leave one every fifteen Inches, or thereabouts; and these alternately, not opposite one to another.

This will reduce the Number of Plants on an Acre to very few, but the Profit will be so much the greater. The Benefit of Woad is not from the Seed but the Leaf; and Experience shews, that one single and vigorous Plant will produce more than five that stand close and starve one another: and what is yet more to the Owner's Profit, one Leaf of this will be equal in Goodness to ten of the others.

When the Plants are thus thinned, and the Weeds cleared away in the Partitions, the Horse Hoe is to be sent into the Intervals, this is to plow deep and turn up the Soil, thoroughly destroying the Weeds, and preparing the Earth to supply abundant Nourishment to the Plants.

As often as Weeds rise in the Intervals, this Horsehoeing is to be repeated; and it will be best to use it also at certain Times, for the Advantage of the Crop in particular States.

To understand this perfectly the Farmer must be led to consider the Nature of the Woad: its Value is in the Leaf; and that consists chiefly in its fine Colour and great Freshness. The Woad draws Nourishment apace while the Leaves are young, and so continues till they get a good Growth; but toward the Time when they are to be cut, being large, they are not so fully supplied, partly because they require more Nourishment; and partly because the Ground is in a Condition to yield less. We have shewn the Occasion of this before; namely, that all Ground, from the Time of its being broken and divided by Culture, grows worse and worse till it is tilled again. Therefore when Plants want most Nourishment, they can obtain least; and this is particularly a Disadvantage to Woad, because its Value depends upon the Freshness of the Leaf, which relies upon the Quantity of Nourishment it can get just at that Time.

For this Reason let the Farmer who raises Woad according to the new Method of Husbandry, contrive his Horsehoeing so that one of them may come just before the full Growth of the Leaf for cutting.

There is a Time when the Leaves of Woad have acquired their Size, and want only their Fullness and Colour; at this Period let him bring in the Horse Hoe between the double Rows. The Earth will by this turning be filled with Nourishment. The Ends of the Roots of the Woad will be cut off, and new ones will shoot from them into the new Earth: thus in two Days the Crop will acquire a new Aspect of the true fresh green Colour; and if ten Days after this Horsehoeing it be cut, it will be in the utmost Perfection whereof it is capable; and the young Shoots that are to rise for the succeeding Crop, will shoot with great Vigour immediately afterwards.

From this it appears plainly, that though a Crop of Woad may be every Way very advantageous to the Farmer; it can no Way bring him nearly so large a Profit as when it is raised

by the Drill and Horsehoeing Husbandry. This Practice is useful for all Plants, but most for the largest.

As to the other Method, those who follow it strictly will yet reap enough Advantage to encourage them to continue the Crop.

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#### C H A P. XLIV.

##### *Of the gathering of Woad.*

WE left the Farmer in the last Chapter, with his Field of Woad sufficiently stocked with Plants, and not over-burthened with them; and free from Weeds. They were in this Condition declared capable of over-powering the Weeds in the common Husbandry, and proper Directions were given for destroying them by the Horsehoeing; therefore the Farmer had only to wait their Growth, for gathering his first Crop.

At what Time of the Year this shall happen cannot be well determined, for it differs greatly according to the Manner of Husbandry; and the Time of sowing; and also in some Degree in Respect of the Richness or Dryness of the Season.

All that can be said in this Respect is, that Woad sown in Autumn will be fit for a first Cutting, earlier than that sown in Spring; and that the Woad raised by the Drill and Horsehoeing Husbandry will be ready to cut earlier, and yield the second Crop quicker than that managed according to the vulgar Practice. For the rest, as the Season is better, the Crop will be the sooner ready.

As warm and light Soils are most suitable to Woad; so a warm Sun and light Showers raise it the quickest to Maturity; therefore the Season will often make ten Days, a Fortnight, or sometimes more Difference in the ripening of a Crop of this Plant.

Let the Owner, when it comes near ripening, watch it carefully; for on finding the exact Time of this depends a great deal of the Advantage. When the Leaf is full sized, firm to the Touch, juicy, and of a fresh and fine Green, it is ripe for gathering; and as soon as it is that should be done.

Nature, in most Things, changes swiftly, from a State of Perfection to Decay; and in nothing more than this Growth. If the Time of Ripeness in the Leaf be not seized, it presently begins to fade, it first grows flabby, and then loses by Degrees its Colour.

This first Accident is very hurtful, but the other worse. The letting Woad stand but three or four Days too long, will reduce a very good Crop to the Condition of a very middling one.

Therefore when the Leaf is ripe let it be instantly cut.

As soon as cut it is to be sent to the Mill, and the Farmer is to prepare for his second Crop.

We have observed that Woad yields several Crops in a Year. In the new Husbandry the Assistance of the Horse Hoe is so great, that these are all nearly of equal Value, and at the same Time there are more of them; but in the

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common Husbandry every Crop is inferior to the first, both in Quantity and Goodness. The Woad of the first and second Crop are sometimes mixed together; but those which come after must be kept separate, or they will spoil; or at least much reduce the Value of the whole.

As to Quantity in the common Husbandry, an Acre usually yields a Tun of Woad, but in the Horsehoeing Method there is no Doubt of its yielding a much larger Store.

Woad will stand some time and yield successive Crops, but it is not adviseable to trust the old Roots too long, 'tis therefore to be renewed after the second Year, with all the Care that we have described as necessary at the first sowing: this is an Expence and Trouble it very well answers.

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#### C H A P. XLV.

*Of renewing a Field of Woad, and of obtaining the Seeds.*

**W**E have mentioned the Necessity of renewing the Woad Field, and we have given the Farmer great Caution with Respect to the Choice of his Seed. These are Articles which naturally fall in with one another.

It is the Course of Nature in the generality of Plants, that the large Leaves which rise immediately from the Root fade, when the Stalk grows up: therefore, as these Leaves are what the Farmer wants from this Use, he is not to encourage or suffer the Growth of a Stalk if he can help it, in the ordinary Course of the Crop: But when he wants Seed he must promote this Growth on certain Plants, that he may have it in sufficient Quantity for his future Occasions. This he is to provide for at the same Time that he renews his Crop for the usual Service.

We have shewn him the whole Management of this Species, and we suppose him to have gone through the first Summer; what remains of the two Years Produce will be easily understood, as to its Use and Management.

When he has gathered the last Crop for the Summer, the Woad will continue growing. It will not rise to Leaves fit for the Common Service during the Winter, but what grow at that Season will not be useless. The Field will be a very rich, wholesome, and nourishing Food for Sheep, and their biting, far from doing any Harm, will prepare it for shooting stronger the next Spring.

After that it is to be managed exactly as the first Year, and the first Crops will be as good but not the following. The Owner will see toward Autumn, the Necessity of renewing his Plants, and he is to do it in this Manner.

When the last Summer's gathering is over, he is to plow up the Ground immediately for the receiving of fresh Seed, but in this he is to observe a particular Caution; for he is to leave a Part of the old Roots, they being to afford the Seed for the succeeding Crops. The rest of the old Roots are to be harrowed up and thrown away, and these being left, and having the full

Advantage of the new plowed Ground, thrive at a surprising Rate, and yield the next Year such a Quantity of Seed that an Acre will sometimes yield fifty Quarters.

This will appear the more surprising when the Reader recollects what we have said in the Description of the Plant, that each Pod has in it only one Seed; but the Number of Pods upon a Plant is in a Manner incredible.

When the same Piece of Ground is to be in Woad for a considerable Time, this is the Method of managing it; but we advise the Farmer rather to observe the Caution we have first given, and not keep any Piece of Ground more than two Years in this Crop; for in that Time, if the Land were ever so rank, it will bring it down to be fit for Corn, and if continued longer will impoverish it entirely: there is no Land that can stand the exhausting of so large a Growth cut so often, except it be refreshed and kept in Heart by the Horsehoeing Husbandry.

In this Method the Intervals, while they are plowed up for receiving the Roots from the Rows, enjoy in other Respects a Kind of Fallow, and after two Years the new Crop may be sowed in the Center of each Interval, and the Places that first held the Rows become Intervals in their Turn, to prepare them for the Crop at the next Change.

If even this should not prove sufficient to keep the Ground in Heart for this rapacious Crop, some Dung may be used, plowing it in in the Intervals. It must be old mellow Dung for this Purpose; and by this Practice the Land may be kept in sufficient Heart for any thing. There is no Crop whatsoever that may not be supported, by this Management, ever so long upon the same Piece of Land, breaking the Intervals often and well, and burying mellow Dung in them at Times, and finally changing, at proper Periods, the Places of the Crops, making that the Middle of the Interval at one Time, which was the Place of the Rows at another. This is the Practice we advise the Farmer for every strong Crop.

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#### C H A P. XLVI.

*Of Weld, or Dyer's Weed, and its Difference from Woad.*

**B**EFORE we enter upon an Account of this Plant, which may well enough be called a Weed, as it grows wild by Way Sides as well as in Fields where it is cultivated, it will be necessary to observe one very natural and very frequent Mistake that is made about it, as it is an Error that may be very prejudicial to the Farmer; this is, the confounding it with Woad. Its Name Weld sounding somewhat like Woad, has led some into this, and its Use in dying like Woad seems to have confirmed them in it; but notwithstanding this Resemblance in Name and Use, the Plants are altogether different, and the Culture that belongs to one does not suit the other.

What is the more dangerous in this Respect



is, that those who have written to inform the Husbandman, have too often fallen into the Error. Mr. HOUGHTON, whose Collections on Husbandry and Trade are much esteemed, falls into this Mistake: he confounds the two as if they were one Plant, and orders for Woad what those from whom he learnt meant of Weld, and what must ruin the Husbandman who should depend upon it. This Account is to be found in his 381st Number of the second Volume, where his Account and the Directions following it do not belong to either Woad or Weld, but are made up partly of what belongs to one, and partly of what belongs to the other.

This will shew the judicious Reader the Necessity of those Descriptions we have prefixed to each of these Heads, of the Plant itself, they may have appeared at first Sight to some superfluous, and to others too particular, but here is a Proof that they are in neither Fault; that nothing can be more wanted than proper Accounts of the Plants themselves, before we enter upon their Culture; and that these cannot possibly be too punctual or exact. Where such a Person as Mr. HOUGHTON should mistake, how is the common Husbandman to suppose he shall escape; especially when he is desirous of improving his Ground by some new Product. There is no other Way but by a perfect Knowledge of the Plant itself: he who had seen Weld and Woad treated of as distinct Articles, and had read an exact Description of each, could never suppose them both to be one and the same Plant, or mistake one for the other; for scarce any two Herbs are more different. It is in this, as in all other Respects with relation to Husbandry, in order to practise it successfully, the Person must understand it thoroughly. This is what we have attempted to inculcate throughout our whole Work, labouring to make the most ordinary Reader know the Grounds and Reasons of every Thing he is to practise, and in every Article begin at the Foundation.

## C H A P XLVII.

*What Weld or Dyers Weed is.*

**T**HOUGH the Names may perplex the unexperienced Reader, none who has once seen Woad and Weld, can ever in his own Mind confound them together afterwards. We are to endeavour here to supply the Place of that Sight of the Plants themselves by the Descriptions and Figures we have given, and are about to give of each.

Woad we have shewn is a large Plant with broad Leaves, covering a great deal of Ground: weld on the contrary, is an upright, slender, and tall Plant, spreading at the utmost over but a very few Inches.

It naturally grows wild on the Banks of Ditches, and is frequent in this State all over ENGLAND. Culture makes no Alteration in it, so that he who knows it wild, cannot miss it in the Field.

It is very upright, and scarce at all branched. The Root is white and fibrous, the Leaves that

rise from it are long and very narrow. They lie spread in a Circle upon the Ground, covering a Spot as big as a small Plate; they are smooth, glossy, and of a pale but fresh green.

The Stalk rises in the midst of these, and has a great Number of Leaves upon it like those of the Root, but smaller. From the Middle upwards, it is covered with Flowers, these are very small and yellow, and they often stand in a kind of Spike of near two Foot long: after them come the Seeds, which are very small, and are contained in open Seed Vessels, a vast Number in each.

The Structure of the Flower and Seed Vessel is this. Each Flower stands in a small green Cup, formed of a single Leaf, divided into four slender pointed Parts, two of which gape open more than the others.

The Flower is composed of three little yellow Leaves, placed one uppermost and two sideways. The upper one is lightly divided into six Parts; the two side ones are each divided into three Parts in the same Manner. Sometimes there are beside these three, two other smaller Leaves in the Flower: these are undivided, and stand at the Bottom, but many Flowers are without them. The upper Leaf is rounded at the Bottom, and has there a little Receptacle for a small Drop of Honey Juice; this Receptacle is flattish, and stands erect just under the Leaf.

Within this Flower there are a Multitude of fine small Threads, each having a little upright Button on its Top. In the Centre of these stands the Rudiment of the Fruit, or Seed Vessel, this is rounded, and has three Points rising from it of the Length of the Filaments. These receive the Dust from the Buttons at the Tops of those Filaments, and convey it down from their Tops to the Embryo Seeds in the Rudiment.

When the Filaments and Leaves of the Flower are fallen off, this Rudiment remains in the Cup and grows larger, it becomes at last ridged and rising; the three Points remain upon it, and it is open just at their Origin. The Seeds are numerous and very small. When nearly examined, they are found to be of a Kidney Shape, and they grow to the Insides of the Ridges of the Vessel.

This is the Structure of the Flower and Fruit of this Plant, it was known to the Antients by the Name of Luteola, and in some Places we call it Would, which comes nearer the Name of Woad than the other. It ought therefore always to be called Dyers Weed, for the sake of Distinction.

The Antients called it Luteola, which signifies the yellow Plant, either from its yellow Aspect when in flower, or else for its Use in dying yellow, with which they were acquainted, and to which Purpose it is used at this Time; in this it differs from Woad, which does not afford a yellow but a blue Colour.

The Husbandman can need no Advice as to what Kind he shall chuse, for there is but one that deserves his Notice. We have a little Sort of Dyers Weed wild in some Parts of ENGLAND, but it is a trifling Plant, and not worth Notice,



Notice, the other is sufficiently distinguished from it by its Bigness.



## C H A P. XLVIII.

*Of the proper Soils for Dyers Weed.*

NATURE points out the proper Soil for this Plant; and that is no small Recommendation of it to the Husbandman, for the same Observation shews, that a very poor one will do. We see the Plant wild; and we see it flourish in that State; and its general Situation is upon a Ditch, Bank; or other dry and poor Piece of Ground; often upon a Wall, and very frequently upon almost bare Sand, or entire Gravel. Nature therefore points out a poor, barren, dry Soil for the cultivating of it; and the Farmer who has Uses enough for his best Land, will be very glad thus to know what to do with his worst.

Weld will always grow upon this with very little Expence of dressing, and it is a Commodity of certain Sale to the Dyers, and of no mean Price.

Let the Husbandman who intends to raise Weld, fix upon some poor, barren, sandy Field, if he have such a one; if not, let him chuse the driest Piece of Ground he has, if it be better than needs, let him not grudge it to this Crop, for he will find a proportioned Advantage. The Weld will grow upon the poorest Ground, it will thrive better, and grow larger upon such as is somewhat richer, provided it be of the right Kind.

I have observed several Pieces of Ground to the South West of LONDON, where the Soil consists only of Sand, and a black Mould; this is the best Ground that can be pitched upon to yield Dyers Weed in large Crops. It is a Sort of Land that requires a great deal of Manure to make it yield well in the common Way of Husbandry, wherefore this would be a very great Improvement: such Land will bear great Crops of this Plant from Year to Year, without any Expence of Manure, and with very little Culture.

In many Parts of HERTFORDSHIRE and BUCKINGHAMSHIRE, they have dry parching Gravels; which yield very little in the common Way of sowing, and that at a very considerable Expence, these would bear Dyers Weed in great Plenty at small Expence.

These Soils, as also all poor Loams that are over sandy and even, the Heath Land that lies dry will bear it; and in many Places Estates may be made by the Culture only of this trifling Article, for so it is in respect of the many others usually sown.

Now that we have shewn the Farmer the Advantage of raising Dyers Weed, we must caution him in one Respect; that is, that when he has found a proper Piece of Land for it, he examine whether there be a Purchaser for the Commodity near him.

As much as this Plant is neglected, there is not any one whatsoever that is more fit to improve Estates in many Places, but it would be

easy to overstock the Market; and there are Places where there wants the Convenience of a ready and unexpensive Sale.

Under these Considerations, few Things can be more advantageous than the cultivating this Plant, and nothing is more easy.



## C H A P. XLIX.

*Of the sowing of Dyers Weed alone.*

WE have observed that there needs no particular Preparation of the Land for the Reception of this Seed, but there is none that requires more particular Caution in the Sowing.

This may be done either alone or with some other Crop; and of these two Ways the first is preferable for very poor Soils, and the latter for such as are somewhat better.

When a poor Piece of Land is to be sown with Dyers Weed alone, nothing more is needful than Plowing, and once Harrowing. As to the Time of sowing it, the Husbandman may take his Choice of Spring and Autumn; but the Autumn is vastly preferable:

We have observed that the Seed is extremely small, therefore a vast Number goes to a small Measure. This makes a little Seed by Measure suffice; but there is a great deal of Difficulty in scattering so small and light a Seed tolerably equal over the Ground.

When the Land is ready, let the Husbandman procure good Seed in the Quantity of a Gallon to every Acre. This is the usual Allowance, and if properly distributed it is enough; the Number of Seeds being very great in this Quantity; but in all the Observations I have made, I never saw a Field that had any tolerable Regularity in this Respect.

The Farmers have a Custom of mixing Dust with the Seed before sowing, to make it spread the more evenly, but this does not succeed. 'Tis scarce possible to sow so small a Seed by Hand alone, but the best Crops shew how imperfectly this Practice answers the Purpose.

We have before us at this Time, a Letter from a very ingenious Correspondent on this Subject, which proposes a great Improvement founded upon the Principles of Reason, and established by Experience. We thank this Gentleman in the Name of the Publick, and wish for the Sake of Mankind, he would extend his Observations to more Subjects, and that others would follow the same useful Steps, we should then see Husbandry appear with a new Lustre.

## To the AUTHORS of the BODY of HUSBANDRY:

## GENTLEMEN,

“ Permit me to give you the most essential  
 “ Proof of my Regard for your Undertaking,  
 “ by contributing my Mite toward the publick  
 “ Benefit. What I have to relate to you re-  
 “ gards a single Article; and one usually es-  
 “ teemed but inconsiderable; but it is one  
 “ which I am sufficiently certain might, with  
 “ proper



“ proper Management enrich many a Land-  
“ owner or Farmer.

“ The Plant I mean is Dyer's Weed, and  
“ what I have observed and practised concerning  
“ it as follows.

“ Observing that the poorest Places abounded  
“ with this Weed, I resolved to try a Crop of  
“ it upon a Piece of Land I had, that scarce  
“ yielded me any thing; and not having an Op-  
“ portunity of buying the Seed, I ordered a La-  
“ bourer to gather it for me from the Banks,  
“ and other waste Places, when ripe.

“ I am situated about eight Miles from the  
“ Sea, in the County of Essex. I went with  
“ my Labourer to shew him the ripe Plants,  
“ and see he made no Mistakes; and thus  
“ had an Opportunity of observing the natural  
“ Growth of this Plant in different Places.

“ I found this Particular, that upon the same  
“ Soil, and under all the same Accidents, the  
“ Plants were larger and finer between me and  
“ the Sea, for two or three Miles, than they  
“ were on the other Side.

“ You will perhaps think it Fancy, and ima-  
“ gine that the Sea can have no Effect on the  
“ Growth of a Plant; at five or six Miles di-  
“ stance; but having studied Botany in my  
“ younger Time, to me there was nothing won-  
“ derful in this, though I soon determined to  
“ make the Discovery useful. There are on  
“ the Side of my Estate, for the little Land I  
“ cultivate is my own, that is next the Sea, se-  
“ veral Sorts of Trefoil that are not found on  
“ the other Side, though the Soil be the same;  
“ and I have observed that several wild Herbs,  
“ which will not grow within the Reach of ab-  
“ solute Salt Water, yet either grow in no other  
“ Places than such as are four, five, or six  
“ Miles distant from the Sea; or no where so  
“ thrivingly.

“ From these Observations, made at a Time  
“ when I little thought they would be useful, it  
“ appeared no Wonder to me that Dyers Weed  
“ should thrive better within this remote In-  
“ fluence of the Sea, than elsewhere, though it  
“ grows naturally in all Parts of the King-  
“ dom.

“ Upon this Observation, and the Practice of  
“ our Farmers, of mixing dry Road Dirt among  
“ the Seed of Dyers Weed, to make it spread  
“ more equally in sowing, I founded the follow-  
“ ing Practice, which answered my utmost Ex-  
“ pectations, and which is the Occasion of this  
“ Letter.

“ Having got together a good Quantity of  
“ Seed, I spread it on the Floor of a Garret to  
“ Air, and in the mean while ordered my bad  
“ Piece of Land to be twice plowed and har-  
“ rowed very even. It is one of those brown  
“ dusty Soils that we see on the Heaths of Sus-  
“ sex.

“ Having measured out five Gallons of Seed,  
“ for my Piece is near five Acres, and this is  
“ the common Allowance; I ordered some fine  
“ small red Sand that lies upon our Coast, to  
“ be brought in wet from the Sea, being pared  
“ away just where the Tide was run off. I  
“ spread this to dry a little in the same Garret,  
“ and when it would just break I measured two

“ Bushels and a half of it to my five Gallons  
“ of Seed; I saw these well mixed with a small  
“ wooden Scoop, and then ordered them to be  
“ sown. This was the second Week in August.  
“ The Seed came up very regularly and strong,  
“ the lower Leaves stood the Winter, and in  
“ Spring the Stalks shot up; I had my Dyers  
“ Weed ripe three Weeks before my Neigh-  
“ bours; and by the concurrent Testimony of  
“ all who understood it, I had twice as much as  
“ ever was raised upon an equal Piece of Ground,  
“ in the Memory of Man.

“ This great Advantage I attribute to several  
“ Causes, all owing to the Mixture of the Sand  
“ with the Seed; but having related to you the  
“ Fact, which is the useful Part, I shall be short  
“ upon the rest. In the first Place my Piece of  
“ Ground was a barren Earth, therefore the Ad-  
“ dition of the Sea Sand enriched it; for though  
“ but small in Quantity, the spreading it even  
“ was a great Advantage.

“ In the next Place the Soil was rendered  
“ somewhat lighter and warmer than before,  
“ both which Qualities fitted it the better for  
“ this Plant.

“ Thirdly, The Seed was by this Means very  
“ evenly distributed over the Ground, for by  
“ sowing it by hand in a careful Manner, where  
“ fresh mixed; and before the Sand was tho-  
“ roughly dry the Seeds stuck to one or other  
“ of the Grains of Sand, and the Weight of the  
“ one carried the other along with it; whereas  
“ in the common Way of mixing the Seed of  
“ this Plant with dry Dust, the Dust goes one  
“ Way and the Seed another; and though the  
“ Dust be very evenly sprinkled, the Seed is  
“ not.

“ But lastly, the great Assistance of all I at-  
“ tribute to the Salt hanging about the Sea  
“ Sand. I doubt not but you very well know  
“ how rich an Improvement Sea Sand is to  
“ Land, and how vastly preferable to that of  
“ Pit or Rivers: in this Case every thing con-  
“ curs to make it take the fullest Effect. The  
“ Improvement it makes in the Soil is what ex-  
“ actly suits it to the Crop; the Richness it  
“ gives is conveyed directly to the Plant in its  
“ first Shoot, the Sand being sown with it; and  
“ finally here is the Advantage of that little  
“ Saltiness, which so well agrees with this par-  
“ ticular Plant, conveyed to Land which lies  
“ too remote for the Influence of the Sea.

“ Whatever you determine concerning my  
“ Reasonings, the Facts are certain, and they  
“ are sufficient. I hope to see the Improvement  
“ communicated to the World by your Means,  
“ and practised wherever there is a proper Land  
“ for this Growth, and Sea Sand within a pro-  
“ per Distance.

“ I wish your Endeavours the Success they  
“ deserve, and am with Respect,

Your humble Servant,

Christopher Hawkins.

We can add nothing to this Account of the  
best Method that ever was invented for sowing of  
Dyer's Weed alone, but shall proceed to the Way  
of sowing it with another Crop.

CHAP.



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CHAP. L.

*Of sowing Dyers Weed with another Crop.*

AS the second Year is the Time at which the Dyers Weed comes to its Perfection, it may very well be sown with another Crop to save Trouble; the small Advance it makes under the Shade of that more speedy Growth, during its Continuance on the Ground, being sufficient to give it Strength in the Root for the ensuing Year.

Some Trouble and some Charge are saved by this Management, therefore many will chuse it; and these are to be informed that there are only two Crops proper for its being sown with, these are Barley and Oats: in either of these Cases the Seed is to be mixed in the Proportion of a Gallon to an Acre, with the Seed Corn of either Kind; and when sown together with that it is to be rolled into the Ground. It will shoot up soon after the Corn, and will continue alive among it, though with a weak Aspect.

As it now only sends up the Leaves from the Root, and they lie naturally spread upon the Ground, and will bear trampling, it will get no Harm from the necessary treading down in the Harvest, nor from the Instruments used in that Employment.

All this Time it has stood just alive, but as the Roots of the Stubble decay, and there is no other Growth to exhaust the Nourishment from the Ground, it will, having Air and Food, begin to strengthen itself and acquire a Look of Health and Vigour. In this Condition it will stand thro' the Winter, and then it will shoot up in Spring and presently come to a fine and rich Growth.

In this Case, as in the Method of sowing alone, the Difficulty is to scatter the Seed equally over the Field. This is not done by mixing it ever so evenly among the Seed Grain, because the Weight of the Grain throws it forward, according to the Direction of the Hand, but this light Seed does not keep it Company. For this Reason I should be for using the ingenious Method of our Correspondent, even in this Case, only mixing the Sand in about half the Proportion which he allows for the sowing of it alone. This will have the same Effect of spreading it equally, and, far from injuring, will be an Advantage to the Corn; the Quantity of Salt Sand, though small, yet being enough to do some Service in the Way of a Manure. This is the best Method of sowing Dyers Weed with another Crop, but however some may please themselves with the Fancy of the Money they save by it, the other is greatly preferable.

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CHAP. LI.

*Of the Management of a Crop of Dyers Weed in growing.*

WE have said less Trouble is required for this than most Crops, but of the little

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that is needful nothing should be omitted. We have shewn how little Preparation of the Ground is necessary for the sowing this Plant alone; and having delivered the best Method ever invented of raising it in this Manner, we are to consider it as it rises, and in its Growth.

If the Season prove dry the Seed will be some time in the Ground before it makes any Appearance, but after a little Rain it shoots up, and the Leaves are of a pretty Green.

When the Leaves are of some Bigness, and spread with Strength, Hoers are to be sent into the Ground: they are not only to cut up the Weeds that rise among the Plants, but to thin the Plants themselves. In this Caution is to be used: the Shoots will be too thick in many Places, but 'tis to be remembered, that this is an upright Plant with few Branches; it may therefore stand much closer than others.

About nine Inches Distance is sufficient for these Plants, and if on any Part they are thinner by the irregular Distribution of the Seed, it will be proper to thin them to that in other Parts, by pulling up instead of cutting away the Plants, and so transplanting as many of them as are wanted.

When the Field is thus left properly stocked with the Plants, it is to remain untouched during Winter: in Spring the Owner should go over it, and if it be a poor Soil he will probably find little or no Occasion for more Trouble; but if a rich one, Weeds will naturally be grown up in it, and in this Case it must be hoed again. This is done at a small Charge, and is very well worth while, it so happily and perfectly provides for the Growth of the Crop.

After this the Dyers Weed is to be left to itself till the Time of gathering. The Strength it has got at the Root in the Autumn, and during the Spring, will be shewn in the Shoot at this Time; and no Weeds will be able to live near it. From this Time it will shoot up very fast and if some warm Rains fall as the Stalk is rising, they will add greatly to its Height.

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CHAP. LII.

*Of the gathering of Dyers Weed.*

THIS is one of those Crops that is to be gathered by pulling: the Roots are of no Service after the Stalk has risen, and consequently the Method is to tear it up by them. This is to be done in the same Manner as the pulling of Flax, but with more Care on Account of the Seed. We have observed, in the Description of the Plant, that the Seed Vessels are naturally open, so that this is easily scattered and lost: the more as it is so extremely small; and this the Owner is to guard against as much as possible, because of its Price; the Seed in this Crop being no little Addition to its Value. Though very small it is produced in a prodigious Quantity; every Stalk being half Way down covered with Seed Vessels, and these quite full of Seed, and its Price, one Year with another, being ten or twelve Shillings a Bushel.

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For the saving of this not only a great deal of Care is to be taken in the pulling up the Plant, but the proper Time for that Operation must be watched strictly. This also is necessary on Account of the Herb itself, and its Use to the Dyer.

There is a Degree of Ripeness at which it is perfectly suited to his Purpose; before that Period it is unripe, and immediately after it changes greatly for the worse, by a beginning Deadness and Decay. Happily for the Farmer this Period of Ripeness of the Stalk is exactly that of the Seed, but he must therefore be doubly careful to watch when it arrives, and seize upon it.

When the Stalk is ripe for the Dyer the Seed has its full Growth and Maturity. It requires only to dry and harden a little, and this may as well be done out of the Ground as in.

To find this exact Season for pulling the Crop, the Owner is to watch the Colour and Aspect of the Stalk, and of the Spike of Flowers.

The Stalk is at first of a faint Green, but when it ripens for Use it grows yellowish; this is the first Signal of its being growing ready for pulling. When this is perceived let the Farmer examine the long Spikes of Flowers and Seeds. The whole Field generally ripens very regularly, so that judging by two or three there will be no great Danger of Error. If there be many Flowers on the Spike downwards, and the Seed Vessels at the lower Part be green and soft, 'tis not yet ready; but by Degrees these Seed Vessels toward the Bottom of the Spike grow hard, and there are only a few Flowers toward the Top of the Plant, and then the Season of gathering approaches. If there have been Wet there will continue new Flowers shooting after the Vessels harden, but these are not to be regarded; the proper and precise Time is when there are a very few Flowers, and those only at the Top, and when the lowest Seed Vessels are hardened, and have the Seed loose in them, and the rest are hardening. This is the proper Ripeness of the Dyers Weed; the Stalks never fail to grow yellowish at the same Time. When the Weather is fair this Condition of the whole Plant comes on very regularly and very favourably; and the Farmer who watches it from the first Appearance to the last, cannot fail of knowing it exactly.

When the Crop is thus ripe the Pullers must immediately be sent into the Field, with Orders to get it all up with Expedition. The Cautions to be given them, if unused to this Crop, are these, they are to draw it up as upright and with as little shaking as possible; and then keeping it still upright they must tie it into small Bundles, and set them up to dry.

There would require Difficulty and Trouble to get up the Plants in this Manner, if pulled before Ripeness; but when the proper Period is observed, the Seed being ripened, the Roots are of little farther Service, their small Fibres rot off, they lose their firm Hold of the Ground, and come up with great Ease.

When this Herb is dry it is fit for Sale, but the Seed is of no Use to the Dyer, nor would at all add to the Value in his Eye. Therefore

the Farmer is to take Care to get it out for his own Supply, and for Market.

To this Purpose, when the Handfuls have stood to dry a little in the Sun, he is to have them housed; and after a little Time he is to examine and see if the Seed be all hardened. When it is he must throw the Bundles on a Floor and thrash them lightly, to separate the Seed. A very little Violence answers this Purpose. Shaking alone would very nearly do it. When the Seed is out it is to be left on the Floor three or four Days, to dry and harden more perfectly, that it may not be in Danger of damaging by keeping; and then is to be swept up and cleaned.

The whole Herb is to be sold to the Dyers; and it is ready for them as soon as thrashed. The Seed is to be sold, reserving a sufficient Quantity for the succeeding Crop, and this is to be sown as soon as it is thoroughly dried. Two good plowings and one harrowing will prepare the same Ground for it again; and thus two or three Crops may very well be raised without Expence. After this it is better to change the Crop than manure the Ground, for Dyers Weed is one of those Plants that do not like Dung.

#### CHAP. LIV.

##### *Of Coleseed.*

THIS is a Produce confined, in a Manner, to a few Parts of the Kingdom, but that might very well be carried to others. We shall shew the Profits to the Husbandman in general, and if we can tempt him to cultivate the Plant, shall not leave him deficient in any Article regarding the Management.

There is the less Reason to wonder that Coleseed, so profitable in some Parts of the Kingdom, is so little raised in others, for this, that the Plant itself is less known than any other among the whole Number of those cultivated for Use. To ask what Herb it is that yields this Seed, is a Question that would puzzle many beside the Farmer. Even its Name is not commonly known. Coleseed is the Name of the Seed only, it is also called Rape Seed, but this does not lead to the Matter; Cole is not the Name of any Plant, and Rape signifies Turnip: we shall explain this Matter, and before we enter upon the Culture shew the Farmer what the Herb properly is that he is to cultivate.

Coleseed is very well known in LINCOLNSHIRE, and some other Counties; and Rape Oil is as well known, which is made from it.

The Seed is known at the Shops, and the Plant by the Farmers who raise it: but nothing more. In some Places the Seed is sown among the other Kinds of what are called young Salleting; but in this Case, as the first Leaves only are eaten, no more is seen of it.

All the Time that this Ignorance remains about the Form of a very useful Plant, it is common wild on our Ditch Banks, and there needs nothing more than to shew its Seed to the LINCOLNSHIRE Farmer, for him to say that is it.

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These are the Inaccuracies and Errors which so greatly retard the Progress of Improvements in Husbandry. The Articles are themselves unknown to those who should be the Authors of those Amendments.

The Price of Coleseed, if the Farmer chuses to sell it in that Condition, is very considerable, reckoning the Quantity an Acre yields; and if he will be at the Trouble of drawing the Oil, the Method of doing it is very easy, and his Profit vastly greater. Nor are these all the Advantages he receives from the Growth of this Plant: it is like the Dyers Weed in this, that it will grow on Soils which will not yield any thing else to Advantage; and though these are of a very different Kind from those peculiar to the Dyers Weed, that flourishing on the moist dry, and this best on marshy Grounds; yet there are enough of these last in many Parts of the Kingdom, to shew how advantageous it must be to the Nation, to render the Plant more known, and the Culture of it among our Farmers more universal.

#### CHAP. LIV.

##### *Of the Coleseed Plant.*

THERE is no other Name by which we can treat of this intelligibly to the Farmer, than this form'd from the Seed: what Herb it is that is thus called in the Coleseed Countries, or what is the Plant that yields Coleseed, we are about to shew.

There are three Kinds of Plants, each containing several Species, and distinguished by different Names, but very nearly agreeing in their Flowers, Seed Vessels, and other general Circumstances, these are, 1. The Cabbage Kind. 2. The Turnip Kind; and 3. The Navew Kind. The Confusion that has been made among these, has been one Occasion of the Uncertainty about the Coleseed Plant.

The Root of the Turnip Kind, and the Stalk of the Cabbage Kind, are what principally distinguish them; as to the Navew it differs very little from the Turnip, and that principally in the Smallness and Length of the Root.

The Flowers of all these are alike, and the Seeds of them all resemble one another, and they will all, in the same Manner, yield that Oil which we call Rape Oil; but there is one Kind that yields it in greater Quantity than the others. This is the wild Navew, called *Napus Sylvestris* by Authors, and this is the proper Coleseed Plant.

The Turnip and Cabbage Kind we have in our Gardens in great Variety, and some have for Curiosity introduced the Garden Navew, or *Napus Sativus*, but it is inferior to the Turnip, and therefore little regarded. The Authors who figure and describe the Garden Navew, figure also a wild Kind, and this is what we have on the Banks of Ditches. We have observed that the Navew differs little from the Turnip, except in the Shape and Bigness of the Root; and this Plant, which otherwise much resembles

the Turnip Kind, yet is properly a Navew, because it has a very small Root.

This is the wild *Napus*, whose Seeds are prescribed in Medicines; and it would be better the Apothecaries gathered them from the Fields, or bought them under their proper Name at the Shops, than use Turnip Seed, as is the usual Custom, in their Stead.

We generally receive the Seed from HOLLAND or FLANDERS; and I have seen that the Seed from different Places is not all of the same Kind. I have observed a Field of the yellow Turnip raised from Coleseed; brought from FLANDERS; and another of a particular Plant of the Cabbage Kind, raised from Seed from HOLLAND. These were equally called Coleseed, and they answered the Purpose; the Seeds were smaller in the first, and dusky in the latter, than those of the wild Navew or right Coleseed Plant, but they each yielded a good Quantity of Oil.

Any of these Kinds therefore will answer under the Farmer's Hands, but as the wild Navew yields much the finer Seed, and much the larger Quantity of it, and that is also richest in Oil; 'tis best to cultivate that particular Kind. This is oftener to be had from HOLLAND than any where else, and we shall inform the Purchaser how he is to know it by the Eye.

The proper Coleseed Plant, or wild Navew, is four Foot high, and of an irregular Growth. The Root is long, slender, and white, 'tis of a sweet Taste like a Turnip, but with somewhat more Warmth. The lower Leaves are long, large, deeply divided at the Edges, and of a dusky Green. One Stalk usually rises in the Midst of these, sometimes two or more. This is round, smooth, of a pale Green Colour, and divided into many Branches toward the upper Part. The Leaves upon this stand one by one, not in Pairs, they are smaller and narrower than those from the Root, and are of a paler Colour. The Flowers grow at the Tops of all the Branches, they are small, of a bright Yellow, and perfectly resemble those of the Turnip: after these come Pods, which contain the Seed. This resembles Turnip Seed, but that it is larger and smoother. The common Appearance of the Plant in Summer, is with long Spikes of Pods, and a few Flowers at the Top of each.

This is the Appearance of the wild Navew in our Fields and on Banks. When it is cultivated for Coleseed it grows somewhat taller and more branched, otherwise there is no Difference; and in good Ground the Root will be larger and more tender. There is no Difference between this wild Navew and the Garden Navew, except that the Root of the Garden Kind is yet tenderer and thicker; but this is principally while it has only the lower Leaves, for when it is suffered to run to Seed the Root grows sticky in the Garden. Indeed there seems no other Difference between the Garden and the wild Navew, but what is made by Culture.

The Flowers and Fruclification of the Coleseed Plant, when nicely examined, are thus formed. The Flowers stand in a Cup composed of four little oval pointed green Leaves, and this does not remain after the Flower is faded, as in the Dyers Weed, but perishes and falls off with it.



it. The Flower is composed of four plain narrow yellow Leaves, placed crosswise. These are broadest at the Ends, and not at all divided; they are of the same Length with the Leaves of the Cup. In the Centre of this Flower rise six Filaments, four of these are considerably longer than the other two: they have small pointed Buttons growing on them. In the Centre of these rises a small upright Body, which is the Rudiment of the Seed Vessel; this has a Kind of Button at its Top, in which there are small Openings for receiving the fine Dust out of the Heads of the Filaments; for in propagating the Seed, when the Leaves and Cup of the Flower are fallen, this Part enlarges, and at length becomes a Seed Vessel of a longish depressed Shape, divided in the Inside by a Membrane, which shews itself beyond its Extremity, and containing several large, round, bright Seeds.

This is the Construction of the Flower and Fruit of the Coleseed Plant, the proper Name of which is wild Navew, and which grow naturally wild, not only in ENGLAND but in FLANDERS, and other Parts of EUROPE.

The Seeds of the natural wild Plant may be gathered and sown; but those from such as has been cultivated raise the stoutest Plants, these therefore the Farmer is to chuse, according to the following Marks.

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#### CHAP. LV.

##### *Of the Choice of the Seed.*

**W**E would have the compleat Husbandman not only introduce every Crop that can be profitable upon his Land, but would have him manage every Kind in the most profitable Manner. When a common Way of conducting himself will bring an ordinary Profit, we mean to stir up his Industry to new Methods by proposing a much larger Advantage. This is the Case in nothing more eminently than the present Instance. Coleseed is a very advantageous Growth, to the Farmer who takes least Care or Pains to understand or manage it. But to him who will set about it on our Principles, it will yield a much greater.

We shall begin with the Seed, for without a due Care in the Choice of this all the succeeding Labour will come to little; now this is an Article in which Mistakes are frequent.

We have observed that there are several Kinds of Coleseed. Of these one is the right and proper Sort, and is in all Respects preferable to the others. Let the Farmer therefore be sure that he knows, and next take Care that he chuses this. The Seed of the Navew is this right and proper Kind; it is very large, smooth, and of a fine bright Colour. Let the Farmer keep these Marks in his Remembrance, and then examine several Parcels of Seed together, to see to which they best answer. All the Seeds sold under the Name of Coleseed resemble one another, but the worser Kinds are either smaller or of a dusky Colour, and less smooth Surface. 'Tis easy to be deceived, till they have been once seen together:

but after this the right Kind will always be known by Sight, and the careful Husbandman will be in no Danger of mistaking any other for it.

The next Thing to being sure of the right Kind, is taking Care it be in a right Condition. Coleseed is a particular Seed, and is much easier damaged than Corn. It consists of a great deal of soft pulpy Matter, under a thin Shell or Crust, therefore it is naturally moist. If it be not carefully kept it will grow damp, and this is a certain Destruction to it. Therefore let the Husbandman take Care that he buys dry Seed, and such as has been always kept dry; not what has been damp and dried again. He will know this by the Colour and the Smell. No Seed is so apt to damage by this Accident of Moisture, and in this Case it gets a raw musty Smell, which never goes off entirely, though it be ever so well dried afterwards. Also as soon as it becomes damp enough to be damaged, it loses the fine bright Colour on the Outside, and this it never recovers again perfectly.

Therefore the Sweetness and Brightness of the Seed are great Marks of its being in good Order; and if the Husbandman keep this in his Mind, and be careful in the Choice, he will rarely be deceived.

The next Thing to the buying it dry is the keeping it so, if there be any Time between the Purchase and the sowing of it; for as this Seed easily receives Damage, it receives it also very quickly. The best Method, as soon as the Seed is bought, if the Ground be not entirely ready for it, is to spread it on the Floor of a dry airy Garret. This not only will preserve it from Damage, but it is an Improvement upon the common Method of keeping it; and will make it succeed much the better.

Next to the Choice and Preservation of the Seed, we are to advise the Husbandman to take Care whence he has it. Although the Plant is equally a Native of ENGLAND and FLANDERS, yet it thrives more in the latter Place, and ripens its Seeds better; so that they are more perfect and are fit for the Production of the strongest and largest Plants. FLEMISH Seed is always to be had; and it will be always to the Farmer's Advantage to get it.

The People in LINCOLNSHIRE and NORTHAMPTONSHIRE, commonly sow the Produce of their own Crop, but this from time to time dwindles; and there is no Comparison between a Field of Coleseed raised from such Seed, and one from FLEMISH or DUTCH Seed, other Circumstances being equal.

While the Farmer gives the Preference to foreign Seed, let him take Care that he do not fall into another Error, that is, let him see it be not old.

All Seeds shoot the quicker and the stronger for being new; and none shews the Difference more than Coleseed. I have seen the Experiment tried by Mr. GRESTON, who for Curiosity sowed the Seeds of several of his own successive Crops, and tried them in a Piece of Garden Ground near one another. The last Years Seed was up five Days before some of the old, and above a Week before others; and the

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Number of Plants from the same Quantity was also greater.

These are very material Considerations. The Newness of the Seed in this Kind, may always be known by the Clearness of the Colour. 'Tis always impaired in this Character, when it has been kept any considerable Time.

Let the Husbandman get a Quantity of this good and perfect Seed from Abroad for his first Attempt, and he may if he pleases sow the Produce of that for two Years more upon his Land; but at the End of that Time, it will be necessary to have Recourse to the same foreign Seed, to keep up the Credit of his Crops: and if he will be at the additional Expence of foreign Seed every Year, he will be repaid with great Interest.

#### C H A P. LVI.

##### *Of the proper Soil for Coleseed.*

**W**HEN the Farmer has procured a Quantity of good Seed, let him pick out the most proper Piece of his Ground for the Crop.

This will depend on the two great Articles, Soil and Situation; as to the first, the richer the Land the better; and as to the other, all that is required is, that it lie tolerably dry. There is no Part of ENGLAND where so much Coleseed is raised as in the Fens, but the Lands are first laid dry that are intended for this Purpose: in the same Manner they cultivate it in FLANDERS and HOLLAND on Ground originally marshy; but they are at all the necessary Pains and Expence of making them properly dry first.

No Lands are more proper for Coleseed than such as have been subject to Overflowings, but they must be secure from that Accident while the Crop is upon them: and must be properly dry, in order to receive it.

Whether this Overflowing have been from Land Floods, great Rivers within Reach of the Sea, or the Sea itself, it prepares them equally for the Crop of Coleseed. Those where Salt Water has come, are properer than any others; but they require somewhat more Preparation.

There are Parts of Essex where the Husbandmen might raise Coleseed to a very great Advantage: and in many Places where Grounds have been newly recovered from the Sea by Banking, and the other Methods we have laid down for that Purpose, Coleseed is an excellent Crop.

Every Piece of fat rich Land is proper for it; and the Farmer need not fear to bestow it upon this Species, for it will yield to his full Content.

If he has a Piece of Ground that is too rank for Wheat, or the other usual Growths, let him sow it with Coleseed: this will yield an extremely rich Increase, and the Land that would not before have done for Corn, will, by proper Management, be perfectly well prepared for it by this Means.

The right Soil for Coleseed is mellow Earth.  
Numb. XLIII.

A soft deep black Mould, with little other Admixture, feeds it better than any other. The Plants never grow so robust, nor the Seed is not formed in such Plenty, or ripened in such Perfection on any other. This is the Reason that marshy and fenny Lands, when properly fitted for the Purpose, answer so well with Coleseed: this black deep mellow Earth is the natural Soil in these Places, one scarce sees any other on breaking the Turf in any of them. This is of all others the best Soil for Coleseed, but we have shewn it is not limited to this only, any deep Soil that is mellow, and properly situated, will do.

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#### C H A P. LVII.

##### *Of preparing the Ground for Coleseed.*

**T**HE Soil we have recommended as most proper for Coleseed, is one of those that does not require any great Labour in Tilling; nor does the Coleseed demand any particularly to its own Management. The black mellow Earth whereon this Crop should be raised, cuts easily, and turns freely under the Plow; and when it is in a proper Degree of Dryness, breaks freely and finely in the working. All that is particularly necessary to fit it for Coleseed, is to make it very fine; and this, unless the Season prove quite unfavourable, or the Husbandman be very unskilful, is a Condition whereinto it is brought easily.

In MAY the Land intended for Coleseed is commonly fallowed: in JUNE it is twy-fallowed; and in the latter End of that Month, or the first Week in JULY, the Coleseed is sown.

After the last Plowing, a fine toothed Harrow should be drawn over the Field: after this, if the Weather be dry, let there be a light Roller carried over it: then let it be very gently and tenderly harrowed again. This last Harrowing, after the Roller has crushed and broke the Lumps, usually make it as even as the Flower Border in a Garden, and this is the proper Condition wherein it is to receive the Seed.

If the Weather prove too wet, let the Rolling be deferred; and afterwards let it be performed with great Caution: for though the Roller may do great Good in this Case, it may also do much Harm. In some Lands the Soil is naturally so loose, but once harrowing divides it sufficiently.

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#### C H A P. LVIII.

##### *Of sowing the Seed.*

**H**ERE we enter upon an Article which leads to very different Practices; and it is now the Farmer is to make his Choice which Method he will follow, that of the old, or that of the new Husbandry. If he chuse the old and beaten Path, his Neighbours soon will shew him that it is easy for him to reap a large Advantage from this Growth; and it will be the greater to him



him as he the more strictly follows the several Cautions we have before given him, relating to the Choice of Seed; and other Articles; which few know; and even they too much neglect.

Thus much is in his Power, by following the common Practice, but if he will use the Horsehoeing Husbandry, he will without doubt reap a vastly greater Advantage. This Method of Tillage is so new, that we have not in all Cases an Opportunity of recommending it upon Experience; but in many wherein we have not had the Advantage of Trial, we may very safely propose it from Reason, and this is one of those Instances.

The great Article in the Value of this Crop, is the Quantity of the Seed produced. This will be the more as the Plants are stronger and more flourishing; and there can be no doubt but they will be much stronger and better when they are raised by the Horsehoeing Method; for all Plants are so.

There are other Advantages of this Growth beside the Seed of those we shall speak hereafter; but this of the Seed is the principal, and deserves the first and greatest Notice; the Crop being to be regulated according to that, not any other.

The Husbandman having his Choice of the Common, or the Horsehoeing Husbandry, may have either a great many Plants growing irregularly on his Field; or a smaller Number disposed regularly and growing longer: it remains to consider which of these will yield him the greatest Quantity of Seed, and he may be certain this will be from the larger Plants.

In the irregular Manner of growing they starve one another; and the Earth between them cannot be stirred and broken to any Depth to give them Nourishment: therefore they will be small, and will shoot up in Height like Herbs raised under Shade; and will have few Branches. In the other Method they will be robust, and will spread every Way in Branches, and all these Branches will be full of Seed Vessels. The Number will be vastly greater, and the Seeds will ripen to a much greater Perfection in them. This will happen because the Plants stand at a sufficient Distance; and because the Earth can be turned up and broken by the Horsehoe between them.

In the common Way of sowing, five Pounds of the Seed is usually allowed to an Acre. In the Drill Method two Pound and a half will be full enough: and as to the Method of doing it, two Rows may very well be drilled at ten Inches Distance, with a five Foot Interval between them.



#### C H A P. LIX.

##### *Of sowing Coleseed in the Drill Way.*

**I**N the common Way of Management, Coleseed is to be ordered much in the same Manner as Turnips. When it is got to some small Height, Hoers are to be sent into the Ground, whose Work serves very well to cut down the

Weeds; and they may also thin the Plants where they happen to have risen too thick, as they will always do in some Places from this irregular Manner of sowing. To thrive well in this Way, they should be suffered to stand at about ten Inches Distance.

In the same Manner when the Husbandman shall think proper to raise this Crop by the Drill and Horsehoeing Method; they must be hoed when they have got a little Strength. In this Respect we need not tediously repeat the Particulars, the same Management should be observed as in hoeing of Turnips, raised by this Husbandry, which we have laid down at large in that Place.

The Weeds in the Partitions between the double Rows, are to be cut up with the broad Hand Hoe; and the Plants should be at the same Time thinned till they stand but one every Foot and half, and these not opposite in the two Series, but one in each Row opposite to the Middle of the Space between two in the other.

When the Plants are thus cleaned out and thinned, let the Horse Hoe or Hoe Plow be sent in as soon as any Weeds appear in the Intervals. This will thoroughly destroy them, and well break the Ground.

This is to be repeated as often as the Weeds rise, only observing this Caution, that at first the Plow tears up only the Middle of each Interval; and afterwards that it come nearer the Edges.

The Farmer need not be under any Uneasiness at the Distance at which his Plants stand, or at the Space of Ground that is left vacant between every Pair of Rows. They will yield the more, and he might even have them at greater Distances than we have named, without Danger of Loss. They will grow robust in this Way, and as it is their Nature to send out on every Side a great many Branches: from these there will shoot others; and they will all be loaded with Seed Vessels, so that moderately speaking, and judging from what is seen in the Course of this Method of Husbandry in other Kinds, one Plant may be expected to produce as much Seed as six in the common Way.



#### C H A P. LX.

##### *Of managing the Crop.*

**W**HEN the Coleseed is sown, there are only two Things necessary, the singling out the Plants to a proper Distance, and the keeping them clear of Weeds while young; for afterwards they will need no Care on that Head, the Plants are so strong, and draw so much Nourishment, that nothing can live among them.

Which ever Method of raising the Crop be used, it is to be thus prepared for a good Growth; and this done, the Owner is to consider, that it has more Uses than one. Though the Seed be the principal Consideration, it is not the only one; and the more Regard is to be

shown



shewn to another, because it comes in order of Time before it.

We have observed that this Plant is of the eatable Kind. As it does not grow so much into Root as the Turnip, its Leaves are more delicate. Sheep are very fond of them, and they afford a rich and wholesome Nourishment. This, properly managed, is a great Article. The Sheep are supplied at a Time when they extremely want Nourishment, and the Crop is far from being injured; on the contrary, it is improved by it. This therefore is to be considered as a very essential Part in the Management of a Coleseed Crop, and we shall give the practical Husbandman the Method of ordering it to the best Advantage.

Coleseed having been sown in the Beginning of JULY, shoots with some Strength; after a few Weeks keeps itself up during the Droughts of Autumn, and getting new Strength and Size in the Leaves from the Rains, which introduce the Winter, becomes in a Condition to resist the strongest Frosts. It stands well, and on every open Day or two, grows during the Depth of Winter; so that in JANUARY, FEBRUARY, and MARCH, the Ground is well covered.

The Leaves which now rise, are of no real Use to the Plant in perfecting its Seed, which is to be done the succeeding Summer. If they grow very rank they rather are injurious, swallowing up too much of the Nourishment that should go to the forming of the young Stalk, therefore they may be spared without Injury. Here is then a great Supply of Food for Sheep, at a Season when Grass is low, and it is extremely wanted; and the Sheep are to be turned in to eat it without any Damage to the succeeding Crop of Seed.

There are those who sow Coleseed in some Parts of NORTHAMPTONSHIRE for this Use alone; and it answers the Intent very well. They use the poorest Land for this Purpose, and on that, although the Plant would never grow vigorous and strong so as to yield any profitable Quantity of Seed, it shoots up very well in Leaves.

In the proper Lands for this Growth, the Leaves at this Season are much finer and stronger, and they may be eaten without Damage to the Crop.

There are those who prefer the Cole Plant on these poor Lands for Food for Sheep, to the young Growth on such as is richer, and they say it is more wholesome; they are not without Reason, but their Experience on this Head should not have led them to discard the Use of Coleseed for feeding on rich Ground, but to use it with Discretion.

The Disadvantage that attends the feeding of Sheep on the rank Growth of Coleseed in rich Ground is, that it makes them swell. This is the same Consequence that is taken Notice of in the feeding them on Clover, but it is easily remedied. 'Tis only at first that this rich Food takes so ill an Effect, and this may be prevented by proper Regulations. When the Sheep are first turned in, let it be toward the Middle of the Day; and an Hour before Sun-set

let them be driven out again into a common Pasture. The next Day let them be turned in earlier, and driven out later; and so the third, fourth, and fifth: after this let them be just driven out at Night for two or three Days more, and let in again as soon as they will in the Morning. This will prevent the Effect of the Coleseed at first, and being now hardened to it by a little Custom, they may be left in the Fields of it altogether, and will thrive upon it excellently, without the least Damage.

Under this Article of the Effect of Coleseed on Sheep, it is proper to mention, that the first Shoots are not all that serve this Purpose. There is another Growth of them that is less rank, and that the Sheep love better; and which not being liable to affect them with any Disorder, is to be trusted to them at their Discretion.

We shall in the next Chapter treat of the gathering of Coleseed, and in an exact Method, we should after that name the Shoots which rise from the Roots and old Stumps of the Stalks; but these being a Food for Sheep, we shall trespass upon Regularity, to avoid dividing this Article of their Feeding.

The Shoots of the Coleseed after gathering the Stalks for Seed, are this mild, sweet, and wholesome Food we have been naming. These grow very strong when there has been Rain, but they are never rank or over-rich. Every one knows the Difference there is between the Cabbage and Coleworts; full grown Leaves first cut for the Pot, and the Sprouts that grow on the Stumps and Stalks after cutting; the Difference is just the same between the first Growth of large Leaves from the Coleseed Plant, and the Shoots that rise after the cutting down the full grown Stalks for Seed.

The Root of the Cole Plant is very strong, it does not decay as many others do when the Seed ripens, but the Crop being cut for that Purpose, the Strength below soon shews itself: a great Number of Shoots rise from the Part of the Stalk where it was cut off, and from the Joints between that and the Root; and some from the Top of the Root; surrounding the Stalk.

If the Coleseed Plants have been cut up for Seed in the End of JUNE, these Shoots begin to appear about the second Week in JULY.

They make but a slow Progress while the Weather is dry and sultry, as it often is for a considerable Time at this Season; but when some Rains come, they gather Strength and rise apace.

These all tend to Stalks, and would form so many new Plants for Seed, but that would not ripen well, nor would come in any Quantity; therefore it is not the Farmer's Interest to encourage it, and happily for him the Beginning of the Shoot is at a Season when the Weather seldom favours its rising to any Height.

Before these young Shoots get Strength for rising up to Stalks, the cold Mornings come in, and stop them, so that they continue small and low; but they grow bushy from the Nourishment they receive from Rains; this is just what the Farmer desires, and they grow more and more fit for the Sheep, and are in excellent



lent Condition for them at the Time when they are most wanted.

We shall add to this general Account of the Coleseed Sprout, such particular Observations as may be useful to the practical Farmer.

In the first Place he must consider the Condition of his Stock, and the Value of the Land on which this Crop is to grow: by these Articles he will be led to know how far it is proper for him to encourage, or suffer the standing of it after the material gathering for Seed: for in some Cases it may be not at all worth while, and in others very profitable.

If from the Circumstances and Situation of the Ground, and his Stock, he find it advisable to continue the Growth, he will vastly increase it by a proper Management.

If it be sown at random, according to the common Methods of Husbandry, it must be hand-hoed just as the Shoots appear. Nature may be left to herself for a little Time, after the Stalks are cut down, and she will give Strength enough to the Roots to make the Shoot; but then if a dry Season follow, as is usually the Case, these young Shoots will turn yellow, and threaten Decay.

In this Case it will be proper to send in the Hoers to clear the Ground between the Stumps; and the deeper they cut the better, for the best Work of this Kind is very superficial and shallow.

The Weeds are few and small that can stand upon a ripe Coleseed Ground, so that the destroying these is but a slight Part of the Design in Hoeing: its great Advantage lies in breaking the Ground, and making it better receive and detain the Dews, therefore let it be broke as much as this slight Instrument will do it.

This Hoeing has also another Use, which is the cutting asunder some of those fibrous Roots that spread from the Bottom of the Stalk, under the Surface. Each broken Root in this Case will send out many new ones, and these will have a fresh broken Earth wherein to spread, and to draw that Nourishment with which the Dews and Rains enrich it. This we have shewn already to be extremely effectual in the supplying all Plants with Nourishment, from the deeper and more perfect Method of Hoeing; and we see that in this slight and imperfect Kind, the Freshness and free Growth of the Shoots immediately after shews the Benefit.

From this, which is the Method to be used for promoting the free and strong Growth of the Shoots in the common Way of Husbandry, we shall proceed to that more beneficial Way of doing it by the Horsehoeing Method, when the Plants have been sown by the Drill. Nothing is of so great Service to this Crop, and indeed, as we have said already, to any other, as the breaking the Ground while the Plants are growing upon it; but this Advantage is always the greater, as the breaking the Earth has been done the more perfectly.

We have advised the Farmer to consider the particular Situation of his Farm, his Stock, and the Value of his Land, in order to determine whether or not he shall continue to raise Coleseed upon the same Piece of Ground. If he re-

solve to do this, we have shewn him how it is to be effected in the common Method, by promoting the Growth of the young Shoots, but this is only for a Time: on the contrary, in the Horsehoeing Method, the same Piece of Land, if the Farmer think convenient, may bear Coleseed for ever, and that in a very beneficial Method, not only for the Crop, but the feeding.

In this Case we are to suppose the Coleseed raised in double Rows, with proper Intervals between Pair and Pair, as we have directed. It is now we will say, JUNE, the Plants are vigorous, and they will soon be ready for cutting. The Method of doing this we shall shew in the succeeding Chapter.

The Intervals afford an excellent Space for the Management of the Plants when cut, and as soon as they are cleared off, and the Seed thrashed out, they are to be plowed up with the Horse Hoe or Hoe Plow. This deep plowing furnishes the Roots of the old Plants with abundant Nourishment, so that they shoot up the Sprouts before-mentioned in vast Abundance, and with great Strength; and at the same Time double Rows of fresh Seed may be sown in the Middle of each Interval for a succeeding Crop. In this Case both will flourish greatly. The Leaves from the Roots of the new sown Plants, and the Sprouts from the Stumps of the old ones; these last will grow with a particular Freshness and Vigour, because all the working of the intermediate Earth for the sowing of the new Crop, will be so many Additions of Tillage upon Tillage for them; and the Roots of the Seedlings will not spread so far at first as to interfere with them. Thus they will grow and flourish together during the Remainder of the Summer, the Autumn and the Winter; and in early Spring, there will be a double Supply of Food for the Sheep.

In the End of MARCH when the Sprouts are well eaten down, for the Sheep having their Choice of both, will be fondest of them, they are to be plowed up by the Hoe Plow; and the Places where they stood are to be made the Intervals for the new Crop.

This new Succession will by the Time just mentioned, have spread out their Roots in Abundance toward the Places where the old Crop grew: the plowing up of the Roots of that Crop, will break and cut off those of the young Plants; and this Earth being thoroughly broken by the same Operation, will be rendered full of Nourishment, and ready to receive those innumerable new ones that will grow from the broken Ends of the old. Thus the Ground will be by the same Operation cleared and tilled, and the Crop will grow in a surprizing Manner: much better than any other Way. The Plants will be very vigorous, large, and full of Seed; and the Crop will be ripe and ready for cutting, a Fortnight sooner than that raised the common Way.

In this Manner, only repeating the same Management on every new Occasion, the same Piece of Land may be made to yield a continual Succession of Coleseed Crops, without fallowing; and, if it be tolerably good Earth, without Manure.



One thing there is, concerning which we must caution the Farmer who shall have the Sense and Spirit to raise Coleseed this Way, which is, the guarding against the too great Luxuriancy of the Crop of Sprouts. We have said they advance slowly during the Summer, in the common Way, and that it is to his Advantage, for otherwise they would run up to Stalk, which is not his Interest, as not the Seed but the Leaf is to be useful to him the ensuing Spring.

If Rains happen soon after the cutting the old Plants, this Accident of the new Shoots running to Stalk is apt to happen in the common Way of Husbandry, because more Nourishment is supplied by the Moisture than is wanted in the Leaves; and the same Thing happens much more certainly from the deep plowing the Intervals, when the Coleseed is raised by the Drill and Horsehoeing Method: therefore if Rain falls soon after, or if the Shoots are over rank without that Assistance, as will often be the Case when the Ground is tolerably good, let him go round the Field himself up and down every Interval, or employ some trusty Person to do it, and with his Thumb and Finger knip off the Top of every Shoot that is running up to Stalk. By this the Advance upwards, which is of no Use, will be stopped, and the same abundant Nourishment which was supplying the Growth that Way, will furnish new Shoots upon the Sides of the first. So that in a Field of this Plant, tolerably good as to Soil, and managed in this Manner, there shall stand, as it were, a Forest of green low Bushes without one Stalk, rising toward flowering: for when such as were most forward are nipped this Way, the cold Weather coming on checks them, and all the Nourishment they draw from that abundant Resource of Tillage, will go to enlarge the first Leaves and form others. A little Observation of what passes in the common Course of Nature on other Occasions, will shew the Farmer how essential and material a Point it is to nip these rising Stalks. They will be of no Use as to Seed, that we have shewn him already.

It is not a Crop of Seed he now wants, that he has had before, what he in this Case desires to have is a Supply of Leaves, for the Food of his Cattle; and the Merit of this Crop is, that these Leaves be numerous and fresh, and full of Juice. Let him observe what happens to the Leaves of other Plants: when they have all the Nourishment to themselves, they are numerous, fresh, and full of Juice; but as soon as the Stalk has got to any Height, and the Rudiments of Flowers and Seeds appear, this being the great Intent of Nature in the Oeconomy of all Plants, the Nourishment taken in by the Root all goes there. The Leaves that were fresh, juicy, and green, become withered, dry, and yellow, the older ones fall off; no new ones grow in the Place, and in fine all decay, and the Stalk alone remains rising naked from the Root.

The Use of the Leaves which rise first from the Root, is of the same Kind with that of the gaudy and beautiful Parts of the Flower. We have observed before, that although these seem the Perfection, and greatest Beauty and Excellence of the Plant, they are intended only to

shield and defend the little obscure Rudiment of the Fruit, or Seed Vessel, that stands in their Centre; and in the same Manner that fine spreading Shew of Leaves, which first rise from the Root of a Plant, are in Reality of no other Use than to secure and preserve the little Rudiment of the Stalk, which is hid in their Centre.

We see that as soon as the Dust from the little Buttons in the Flower has impregnated the Rudiment of the Fruit, the gaudy Leaves decay and fall off, the Nourishment being all conveyed to the useful Part, the Fruit or Seed Vessel; and in the same Manner, as soon as these Leaves have defended throughout the Winter the young Bud of a Stalk, and that by the Heat of the Spring Sun begins to rise in Height, and shew its Buds for flowering, all the Nourishment is conveyed to it: The lower Leaves have done their Business, and they fade and perish.

The Case is just the same in the Shoots from the old Stumps of Coleseed, as in the Leaves from the Root at the first sowing. The Leaves that rise from the Top, and from every Joint of the old Stump, have the Rudiment of a Stalk within them. This is the Purpose of Nature, but it is the Farmer's Business in the present Instance, to check it. When it rises the Leaves will fade, but so long as it is kept down, whether that be done by Art or Accident, all the Nourishment intended for it by Nature, will be given to the Leaves. This is the Reasoning upon which the Practice of nipping off the Buds of the Coleseed Sprouts is founded. We would have the Farmer understand all he is advised to practise.

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#### C H A P. LXI.

##### *Of the gathering of Coleseed.*

**T**oward the End of JUNE the Coleseed Plant, in whatever Way it have been raised, will be fit to cut. The Husbandman must therefore keep his Eye upon his Field very carefully toward that Period; for it is of the utmost Importance to him to seize it when it comes. No Day of the Month, or other precise Time, can be named for the gathering this Crop, because the Differences of Soils and Seasons promote and retard its ripening; and even the Variety of Management, or the Age of the Plant, may make ten Days or a Fortnight Difference in the ripening in two Fields of the same Soil in the same Year. We have told the Husbandman about what Time he is to expect it; and shall add the Signs by which he shall know that it is fit for Harvest. One Caution we must give him withal, that as the Soil and Method of Culture may make a very great Alteration in the Time of ripening, he must be upon the Watch accordingly, expecting it earlier by a Fortnight in rich Soils and the most careful Conduct, than he need in poor Land in the common Way. It will be in vain that we lay down the Signs of its ripening, if he slips the Time.

We have observed that the Coleseed Plant has small Flowers on the Tops of the Stalks and Branches, which when the Leaves fall off are



succeeded by Pods. As the Flowers that opened first are thus followed by the Seed Vessels, other Flowers open upon the Tops, which shoot up continually higher and higher. Thus, when the Plant begins to flower, nothing is seen but a little Button or Tuft of Buds at the Top of the Stalk, and of every Branch, with one or two Flowers opened or opening upon it; but when it has been some time flowering the Aspect differs, for then the Branches having lengthened, from the Time of their beginning to flower, all that Part of them which was the Top, and where successively the former Flowers appeared, is covered with Seed Vessels; thus each Branch terminates in a Spike or Seed Vessels a Foot or more in Length, with a few Flowers at its Top.

The Quantity of Seed is the Riches of the Crop, therefore it would appear at first Sight, that the longer the Plant stood, so long as it continued flowering, the more advantageous would be the Growth, but there are Limits to this Encrease, beyond which all is Waste.

The Course of Nature is to ripen these Seeds, and then shed them upon the Ground for producing the Plant again: therefore when ripe the Pods open of themselves, and the Seeds are lost. This no Art can prevent; and for that Reason the Time is to be watched when any of them begin to open, and that is the exact Period for gathering.

When a new Flower is formed, the Rudiment of the Pod from which the last fell, is but small; it continues to encrease in Size before it begins to harden, or properly speaking to ripen, so that several successive young ones are left by the Flowers before any one is ripe. This is the Occasion of the Length of the Spike of Pods, while all are yet entire; but when they begin to open let the Husbandman be speedy in gathering, for he will deceive himself very much if he imagine it as well to let it alone awhile, supposing the new formed Pods at the Top of the Stalk will make Amends for the old ones that are lost at the Bottom: the lowest Pods are the fairest always, and three of the young ones will not supply the Place of one of the lower.

The Farmer now understands the Period whereat his Crop is to be gathered; and it will be easy for him to judge at Sight when it is about to arrive at that Condition.

The Length of the Spikes of Pods is one obvious and familiar Token, while they are short the Crop cannot be fit to gather, because, while they are in that Condition there are but few of them, and none of these are ripe.

When these Spikes have got a considerable Length, their Colour is to be regarded. The Pods while young are always green, as they grow toward Ripeness they lose that Colour; at first they become pale, then yellowish, and lastly brownish. The whole Spike, while very young, is green.

When some of the Pods approach toward Ripeness they change Colour, and the Greenness is only seen at Top; when, upon a cursory View, there are some found to grow brownish at the Bottom, and those in the Middle are yellowish or pale, those at the Top only being green, then the Time of gathering is at Hand. It is the In-

terest of the Owner to let them stand so long as all are safe, but no longer. He is therefore now to look into the Field once or twice every Day, in a more strict Manner. He must examine the bottom Pods of the ripest Spikes; so long as these are close all is safe; but as soon as some of them begin to open the Time of gathering the Crop is come, for after this every Hour's standing will be attended with Loss.

The best Method of cutting Coleseed is with a strong Sickle, in the same Manner as Wheat is reaped: but this must be done carefully. There is no Part of the Farmer's Occupation that requires more expert and honest Labourers than this. The Stalks are pretty thick, and by that Time the Seed is ripened thus far, they have lost their juicy Condition, and are grown hard and sticky. They are not easy to be cut, and yet that must be done evenly, and with little shaking. A great deal of Care is to be taken, that the Sickle goes easily through them, and when separated from the Root they must be laid gently down in Handfuls, that they may dry.

About one third Part of the Seed is ripe at the Time when the lowest Pods are ready to open: in the lying exposed to the Heat of the Sun at this Season, more than another third hardens, and becomes good; so that above two thirds of the whole Quantity of Pods yield good Seed, and this is all that can be expected; for if the Farmer were to stay for the ripening of the other third, while growing, he would lose the Seed from the lower Pods, which is much more valuable; and the Seed is of a sufficient Growth to ripen or harden in the Sun after the Plant is cut down.

In the common Way of sowing Coleseed, 'tis difficult to lay the Handfuls well to dry from the reaping, and a great deal of the best Seed is lost for want of this Advantage; but in the Way by drilling all will be easy, and there will be no Danger of Loss, for the Intervals will serve excellently for spreading the Plants.

When the Crop has been once laid on the Ground it is not to be stirred till dry, for the Seeds in the lower Pods are so loose, that they will shake out with the least Motion, and be lost. What is required from this Exposure is, to dry and harden them, and they will get this sufficiently by lying tolerably thin, without being moved. If the Weather be very hot the Business is done the sooner, if otherwise somewhat more Time is required, generally from ten Days to a Fortnight proves sufficient. The Proof that they are dried enough is, when the Pods toward the upper Part of the Spikes open easily, and the Seeds in them are hard.

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## CHAP. LXII.

*Of thrashing the Plants, and the Uses of the Seed.*

WHEN the whole is in this Condition, nothing is required but to get it to the Barn, and thrash it. In Lancashire they save themselves a Part of this Trouble, by thrashing



ing it in the Field, they spread a large Sheet upon a level Part of the Ground, and lay a Quantity of the Herb on it: a little thrashing does to dislodge the Seeds, which are already loose and most of them in Danger of falling out of their own Accord. I have seen this practised without much Loss, but it is an irregular and awkward Method; it leaves the Farmer's Produce, after all his Toil, very much at the Mercy of the Winds, and cannot be performed so well as in Doors.

The Method I would therefore recommend to the Husbandman, if the Ground be any thing near Home, is this, let a Parcel of large Sheets be spread in the Field, and the dried Stalks carefully taken up in their Bundles, and laid on them. Each Sheet will hold a great deal this Way; for though the Parcels must be very gently moved to the Sheet, they may be pressed hard, and handled roughly there; for what Seeds fall out will be saved.

When the Sheets have as much in them as they will hold, the Edges and Corners are to be gathered in and fastened, and the several Parcels are to be carried to the Barn: there they are to be thrashed with a careful but light Hand, that all the Seed may be got out, and as little of it as possible bruised, for it is tender and easily hurt, especially when fresh.

After it is separated from the Refuse that was mixed among it in the thrashing, it must be spread on a Floor pretty thin, and turned often till it is thoroughly dry and hardened; for otherwise, when put up, it will quickly grow damp and mouldy.

The Seed thus prepared for keeping is also in a better Condition for immediate Use, than when too green: the Farmer may sell it, or send it to the Mill on his own Account to be ground and pressed for Rape Oil, the Sale of which is certain, and the Price, considering the Charge, tolerably high. If the Seed be sold as soon as thrashed and dry, it brings from eighteen to two and twenty Shillings a Quarter, and the Produce at an Average in the common Way of Management, and upon middling Ground, may be reckoned at five Quarters to an Acre: much more Advantage may be made of it, if the Farmer will have the Oil drawn himself; and in the Method we have proposed by the Drill and Horse-hoeing Husbandry, it will be easy for him at any Time to double his Profits: in many Cases, taking all the necessary Care, and making the most of his Produce, he may make it treble.

We have observed that in the new Method of Husbandry, the same Piece of Land may be made to bear Coleseed ever so many Years in Succession. According to the vulgar Practice the several Kinds of Corn may be sown after it. In NORTHAMPTONSHIRE, where the Land is rich, they find Coleseed a very good Preparer of it for Barley or Wheat; in LINCOLNSHIRE, where it is not so good, they sow Oats after it very profitably.

The Use of the Coleseed is not over when the Oil has been pressed from it. The Cakes that remain are a large Quantity, and as the fresh Leaves feed Sheep, these in a proper Method of giving them, turn to a very good Account for

feeding of Cows. In Winter this is an excellent Food for them, for keeping them in Heart and Strength, at a Time when other good Food is scarce.

Calves are also to be fed with Coleseed Cakes very profitably, but that in a particular Manner. After the Oil is pressed out as clean as the common Practice can obtain it, there still remains so much of it in the Cakes, that when they are beat to Powder, and mixed with hot Water, they make it white and milky, in the same Manner as sweet Almonds beat up with Water make an Emulsion. This is the Way of giving it to Calves, and it proves a very rich, wholesome, and strengthening Food. Calves may be fed with this from three Days old, till they are fit to eat Grass or Hay.

In FLANDERS and HOLLAND, where Coleseed is raised, and its Oil pressed in great Quantity, and to great Advantage, they constantly make both these Uses of the Oil Cakes: it is surprizing that in many, nay in most Parts of ENGLAND, where they raise this Crop, they know no other Use of the Cakes than as firing. In LINCOLNSHIRE they heat Ovens with them, while they want Winter Provision for their Cows. In some few Places, and but few, they have got into the Method of giving the Cakes in Water to their Calves.

There are many Reasons to wish this Species were more cultivated than it is in ENGLAND, but there is but poor Hope of that being brought about, when those who do raise it know but a small Part of its Management, or its Advantages.



## CHAP. LXIII.

### *Of Liquorice.*

**H**itherto we have treated of Articles known to be raised by Husbandmen, in different Parts of the Kingdom, and familiar by Name among Country People; so that the Farmer who never had before thought of raising them himself, yet knew others did so: here we mention one which, being less common in the Profession, may make some of the common Practisers of Husbandry wonder at its being added to the List of Things recommended to them for Culture. They know Liquorice by Name, and they are sensible that it brings a large Price at the Drug-gifts: much of it is imported from GERMANY, and other Parts of EUROPE, but we can acquaint those Farmers who have not been in the Way of knowing it, that very considerable Quantities of this valuable Root are raised in Fields, in some Parts of ENGLAND, and may be in many others. We have all along observed, that great Gains are to be made in Husbandry by going out of the common Road, and this is one of the Instances.

We would not advise the Farmer to let alone his common Occupation, or to neglect the usual Articles of his Profession; on the contrary, we have made it an essential Part of our Work to inform him of every Method of managing them to the best Advantage; but with the Cultivation



tion of these we would have him keep his Eyes open to that of other Things: particular Soils and Situations suit particular Growths, and we would have him a Master of the several Articles in his Business, uncommon as well as common; that when he has an Opportunity of gaining considerably, by adding some new Species, he may not over-look the Advantage. It is in this Light we propose Liquorice to his Consideration; and having thus far explained the Intent of naming it in this Place, shall proceed to acquaint him with the Nature of the Plant, its proper Soil, its Culture and Advantages.

The Root of the Liquorice Plant is a Yard long, and as thick as a Man's Thumb. It is soft but very tough, brown on the Outside, and yellowish within: it is full of Juice, and though not easily broken, may be beat out into a Kind of thready Substance: its Taste is very sweet and pleasant, it spreads and encreases naturally in the Ground, and is less in Danger of Accidents than most other Roots.

From this Root rise the Stalks, which are tall, firm, and tough, they are a Yard or more in Height, they have but few Branches, they are of a brown Colour, and covered with a Kind of clammy Moisture, so that they stick to the Fingers when touched.

The Leaves are somewhat like those of the Tare, each being composed of a great many smaller ones, placed on the two Sides of a Stalk, or middle Rib.

The Flowers are also of the Form of those of the Vetch or Tare, but small and inconsiderable; and they are succeeded by Pods, which are short, flatted, and upright.

The Flower of the Liquorice stands in a small green Cup, which remains after it is fallen, and encompasses the Bottom of the Pod. This Cup is composed of a single Leaf, which is hollow at the Bottom, and toward the upper Part is divided into two Lips: the upper Lip is again divided into three Parts, two narrow and pointed at the Sides, and the middle one broader and nicked in the Middle: the under Lip is undivided, and is narrow and pointed. This is the Cup which receives and sustains the Flower. The Flower itself is composed of four Leaves, in the Manner of all the Pea and Tare Kind. In the Body of the Flower there are ten Filaments, one stands alone, and the other nine in a Cluster; at the Tops of all these there are round Buttons, and in the Centre of these rises a small Lump, which is the Rudiment of the Fruit or Pod; this is buried in the Cup, and sends out a long Filament pierced at the Top, to receive the Dust from these Buttons for impregnating the Seeds.

When the Flower has fallen off, this Rudiment by Degrees enlarges into a short, flat, and sharp Pod, in which are a few Kidney-shaped Seeds. There are two Kinds of Liquorice beside the common, distinguished the one by having hairy, and the other prickly Pods, but these are not worth the Farmer's Notice; the Smoothness of the Pod distinguishes the right genuine Liquorice used by the Apothecaries, as does also the Bigness, Juiciness, and fine Taste of the Root; the others have sweet Roots, but they are harder and less pleasant.

The common Liquorice is a Native of GERMANY, FRANCE, SPAIN, and ITALY; we have it not wild in ENGLAND, but being natural to Climates so much resembling our own, it grows with us in Perfection.

It was very well known to the Antients, who called it Adipsos, because it conquers both Hunger and Thirst. THEOPHRASTUS mentions it under the Name of the SCYTHIAN Root, SCYTHIA being the first Country where it was known to be cultivated. It served these People by Way of Nourishment, they would live a long Time upon this Root and Mares Milk Cheese, without seeking after any other Food. It is raised in some Parts of YORKSHIRE, NOTTINGHAMSHIRE, and SURRY with us; and may be introduced in many other Places, to the great Benefit of the industrious Planter.

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#### C H A P. LXIV.

##### *Of the proper Soil for Liquorice.*

**A**LMOST all Plants thrive best in a rich Soil, but Liquorice will not grow in any other. One Requisite more there must be in the Land for this Purpose, that is, the Soil must run deep. The thriving of Liquorice depends altogether upon the free Depth of the Mould, and its Length of Root, which is the great Advantage cannot be expected in any other.

We expect to see the Root a Yard or more in Length, and it must have free Passage, otherwise it will not grow strait; this Regularity of Shape is not only a great Beauty, but a real Advantage, for the crooked Roots are never so tender and juicy as the others, nor do they so soon arrive at their due Growth.

The proper Ground for Liquorice is that which has a deep Coat of mellow Earth, a black Mould that begins directly under the Turf, and runs three Spit deep, without any great Mixture of other Matter in the Way. This is the best natural Soil for this valuable Plant, but there are others which will do by Nature, and others yet that may be so prepared by Art, as very well to answer the Purpose.

After this fine black Mould the next Soil in Nature is a deep rich Loam, that has not much of the Clay in its Composition, and has a good deal of fine Garden Mould among it.

The third natural Soil that we shall name as fit for this Plant, is the deep, warm, sandy Kind, which is not barren, but with its Lightness and Warmth has some Richness.

In all these Soils the Depth ought to be at least a Yard, before there is any hard Bottom, and that must be examined; for if it prove a Clay the Liquorice will never thrive, because of the Coldness and Dampness that naturally attends such an under Stratum, the wet lodging upon it and starving the whole Soil.

What the Liquorice requires for perfect thriving, consists in four Articles, Depth to penetrate, Lightness in the Soil that it may make its Way easily, Warmth to promote its Growth, and Richness to supply it Nourishment. These Advantages it enjoys in various Degrees,



in the several natural Soils we have named, for no one of them has them all in Perfection; and therefore it may be possible by Art to provide a Soil for the Growth of Liquorice, which shall be better than any of these.

To explain this by Particulars. In the mellow Earth or black Mould, there is often Depth and Lightness enough, and there is always Richness to supply it Nourishment; but then this Soil is apt to be cold: there wants therefore the fourth Article Warmth, to promote its speedy Encrease in Bigness. In the same Manner in some of the loamy Soils there is Lightness, Depth, and Warmth, but there wants Richness; and finally, in the sandy there is Depth, Lightness, and Warmth in the greatest Degree, but there wants Richness and Nourishment. The Effect of these several Advantages and Disadvantages in the Soil, for the Growth of Liquorice, I have regarded in the Observations I have made on the Places where I have seen it grow.

Thus in YORKSHIRE, where the Soil is a mellow rich Earth, as about POMFRET, the Liquorice is very large and juicy, but it grows slowly; in NOTTINGHAMSHIRE the Soil is loamy, and the Liquorice grows moderately, but is inferior to the POMFRET Kind; and in SURRY, where the Soil is sandy, the Root grows quick, but it is meagre, dry, and poor, it never has the fine juicy Texture, or rich Taste of the YORKSHIRE Kind.

From these Advantages and Defects in the Plantations of others, the judicious Farmer will find the Way to make the best Profit of his own, by adding what is wanting in each, and avoiding what is amiss. It is to be observed, that in the preceding Observations we speak of these several Soils left to Nature, for when they are manured they are changed; and it is impossible to describe the Soil of any Place, as altered by the various Means of Culture.

To these several Grounds for the Service of this Article, we are to add the made Soils about LONDON, where there is a great deal of Liquorice raised in the Grounds of Planters to a considerable Profit. This is large and juicy, but it is not so good as the YORKSHIRE Root, it is less tough, and is more subject to Accidents, nor has it the fine yellow Colour, or true rich Taste of the best Northern Liquorice. It will grow mouldy if laid up in damp Sand, whereas the YORKSHIRE Kind will be perfectly well in that Manner for a long Time; and when beaten out for Use the Threads are more wet, and as it were rotten; they have not the stringy Toughness of right Liquorice: the Plant is the same in all these Conditions, 'tis the Soil only that makes the Difference. The Liquorice of SURRY is starved, that of NOTTINGHAMSHIRE is but half nourished, and that raised in Gardens about LONDON is over-supplied with Nourishment, and that is of too rank and moist a Kind: the same is the Case with many other of the Products of these common Gardens, though less regarded.

We see by the several natural Soils, and their Effect, and by that of the made Ground about LONDON, that each of the others may be improved; consequently that a made Soil may be better for Liquorice than any of them, but we see at the same Time, that the Garden Ground

about LONDON is not the right Kind; what the careful Husbandman is to learn therefore from these several Observations is, that there is an easy Way of mending any natural Soil, for the Production of Liquorice; and that whatever his Ground naturally be, he may convert it into a proper Sort by additional Mixtures.

The several Defects and Faults of those Soils, on which Liquorice is propagated in different Counties of ENGLAND, are so opposite to one another, that whoever has considered the Principles laid down in the Beginning of this Work, will find it is very possible, and very easy to improve any one of them, by a Mixture of the other; and consequently, that if he have a Soil of the Nature of any one of these, he may improve it and encrease his annual Produce greatly, by mixing with it some other Soil of the Nature of one of the others.

Thus if he have a mellow Earth, or deep black Mould, of the Nature of the POMFRET Kind, he will know that Liquorice will grow fine, but slowly with him; therefore let him, when he digs up his Ground of this Kind, mix with it a good Quantity of Sand, such as composes the principal Part of the Soil in SURRY; and this will make it grow quicker, while there is yet enough of the natural Richness of the Earth to feed it very well. In the same Manner, if his Soil be loamy, as that of NOTTINGHAMSHIRE, or sandy, as that of SURRY, let him add mellow Earth to it, and he will make his Liquorice rich, while the natural Condition of the Ground continues to hasten its Growth.

He sees in the same Manner the Effect of Manure about LONDON, where it is used in great Plenty; and he finds it has Advantages and Faults. The Advantages it possesses are owing to the Dung that is used, and the Faults are owing to the Rankness of that Dung, which is too much for a Root of this Kind.

Having laid thus before him the Reasons of every thing he is to do, I shall add by Way of Example, what I have myself practised with great Success, for the raising this Species, and lay down what I am convinced is the very best Method of improving and preparing a Soil for it. I shall limit it to the single Instance of my own Experience, but the Effect being seen the Steps may be varied according to Occasion.

I had a Field of an Acre, or somewhat less, the Soil was a good light Loam, but not very rich, and it ran near three Foot deep, with a firm light Gravel at the Bottom. It came into my Mind to try this for Liquorice, and I prepared it in this Manner; I threw on thirty Load of very old and well rotted Dung; and forty Load of Mud, from the Bottom of a River that ran near it. All this I plowed deep in, and repeated this Operation till it was thoroughly mixed with the natural Soil. This had before been of a yellowish or Orange Hue, and sandy, but when this Addition was well wrought in it looked black, and broke mellow, in the Way of Garden Mould. This Field bore the finest Liquorice I ever saw any where, and I have examined most that is raised in ENGLAND. As to the Manner of planting it, that will be delivered in the following Chapter.





## C H A P. LXV.

*Of planting Liquorice.*

**L**IQUORICE, though raised in Fields, requires a Sort of Garden Culture. The Spade is a much more proper Instrument for preparing the Land for its Reception, than the Plow; for it requires to be broke and rendered fine, to a Depth that the Field Instruments can never reach.

There is this Comfort however to the Husbandman in Respect of it, that if the Land require a very expensive Tillage, the less of it serves; a few Acres will yield a vast Produce in this Root, and the Price is so much greater than that of most other Things he can raise, that there is no Reason to grudge the Charges.

To make the Ground ready for receiving of Liquorice. It is first to be dug up carefully, but even this is not to be done in made or improved Soils, till the Additions have been thoroughly blended and rotted in the Ground.

Thus supposing an Earth improved as in the last Chapter, by the Addition of rotten Dung and Mud, these are to be plowed in toward Autumn, and the whole is to be broke again once or twice during the open Weather in the succeeding Winter, and so left to mellow; for the Dung will not otherwise thoroughly break and mix with the Soil. If it remain in Strings or Cakes, it will not be easily broke by the Spade; and if it remain whole, will break in upon that perfect Lightness of the Earth, which is so essential to the Growth of Liquorice. For if there be the least Thing to obstruct the Passage of the Roots, they lose their Straitness, and after that they never thrive.

When the Ground has lain thus the Remainder of the Winter, let it be dug in the following Spring with particular Care, and in peculiar Manner. Let the Labourers be sent in about the Middle of FEBRUARY, and let the Master's own Eye be over them, or that of some trusty Person in his Stead. They must dig every Part of the Earth thoroughly, no less than three Spits deep; and as they lay it, must carefully break every Lump, though but small, that the Ground may be smooth and level at the Surface, and be in a Manner as fine as Sand all the Way down. This will never be honestly done without great looking after, and it is very essential that it be so done; the Expence is considerable, but the Profit answers; and of this the Husbandman may be perfectly assured, that by every Shilling he would save in this Work, he will lose ten in the Crop.

When the whole Piece of Ground is thus prepared, the Liquorice is to be planted; and in this the same Care and Caution are necessary as in the rest, for the least Omission, or the least Carelessness, will be attended with Loss. The first Care in this Respect is, the Choice of proper Sets or Plants; and the second is, the placing them properly in the Ground.

For the Choice all depends upon their being in good Condition, and having a good Bud, or

as the Planters call it, an Eye. They are to be got from the Seeds, or the Heads of the old Roots; and their best Length is a Foot, or thereabouts.

The good Condition of these will be seen by their Soundness, Freshness, and clean Surface; and the Strength of the Bud or Eye, is an Article in which none can be deceived.

'Twill be toward the Beginning of MARCH, by that Time the Ground is thus perfectly prepared, and the Sets are chosen, then they are to be planted in the following Manner.

Let there be got ready a Gardiner's Line, of such Length as to reach cross the Ground if small; if larger, it may be removed from Distance to Distance, a Couple of Sticks sharpened at one End, and a Ball of thick Cord is all that is needful for this Purpose. Beside the Line, there is to be a setting Stick, which may be of any convenient Length at Pleasure; but it is best to have it of a certain Dimension in this Respect, that it may serve as a Measure; and for this Reason I advise it to be just a Foot and half long, with a Handle like that of a Spade, and a point Head, with a square Piece of Iron in the Manner of a very large Spike, hollow'd at the large End to receive the Point of the Wood.

These Things being ready, let the Stake to which one End of the Line is fastened, be stuck into the Ground a Foot from the Edge of the dug Part, and the Line let loose, that the other Stake may be carried to the other End of the Ground, or as far as the Line will by its Length permit; and then it must be stuck into the Ground, drawing the Line tight, at the same Distance from the Edge of the prepared or wrought Part. Thus there will be a strait Line drawn along the Skirt of the Ground, within a Foot of the raw Earth.

Let the Planter now taking his Sets in his Apron, and the setting Stick in his Hand, begin to plant, placing the first Set at half the Sticks Length from the Edge of the Ground. When he has set this, let him measure from it along the Line, the Length of the setting Stick, and then plant another, and so on to the End. This is very familiarly and easily done, and the Manner is this.

Let the End of the setting Stick, which is pointed with Iron, be thrust into the Ground, and pressed till near the whole be in; let it not be stirred about, but just enough to make an Edge, that the Earth may not fall together. The setting Stick being gently drawn out, there will remain an open Hole of about sixteen Inches deep. Into this a Set of the Liquorice is to be put, thrusting it carefully and evenly in, till the Head of it where the Eye or Bud is, be one Inch beneath the Surface: then the bottom End will be about the Bottom of the Hole, and a little Mould being drawn over the Top, the Set is compleatly well planted.

One being set in the rest is very easy. The setting Stick is to be laid along the Line, its Point just at the Head of the Set, and its other End marks the Place where the next is to be planted: the Length of the setting Stick being a Foot and half, and that being the most

advan-



advantageous Distance at which Liquorice can be placed in the Row.

This second Set is to be planted exactly in the same Manner as the first, and so on till there be a Row planted all along the Line.

When one Row is thus planted, the next is to be set into the Ground. As the best Distance for Liquorice is to plant it in Rows at a Foot and half: so the best Distance of the several Rows one from another, is two Foot and a half; and in these they are best set not directly opposite one to another, but in the Chequer or Quincunx Order.

To execute this, the first Row being planted, one of the Sticks is to be removed two Foot and a half by Measure into the Ground, and then the other, tightening the Line. Thus there is a Row marked out of the exact Distance of two Foot and a half from the first. This done, let the Planter take a fresh Parcel of the Sets into his Apron, and taking the setting Stick in his Hand, let him make his first Hole directly opposite the middle Space between the first and second Set of the former Row.

When the first Set is planted there, according to the Directions just given, let him lay down his Stick from the Top of that Set, and measuring thus the due Distance of a Foot and a half there plant another.

This he is to continue the whole Length of the Line; and there will then be a second Row at two Foot and a half Distance from the first, and each Plant in it will stand opposite to the middle vacant Space between every two of the others.

When this second Row is planted, the Line is again to be removed two Foot and a half farther into the Field, and a third Row is to be planted. The several Sets in this third Row are to be placed directly opposite to those in the first Row; and when this is done, every four Plants of the first and third Row, will have one Plant of the second Row in their Centre.

This Method is to be continued interchangeably through the whole Field, and this is what is called the Quincunx Manner of planting; the Effect of which is, that every Way wherein one looks at the Plantation, when the Stalks are risen, there appear regular Rows of them the whole Extent of the Field, with regular Alleys between them.

If the Farmer ask, Whether this we have here delivered be the exact Manner in which Liquorice is planted in those several Places we have named, we shall answer him, that it is not. They no where allow so great a Distance to the Plants; but this is an Error that has prevailed in every Article of Husbandry, and which we hope to see set aside one after another in them all.

Having given him in this Detail of Particulars, the Method which Experience shews to be best of all others for planting of Liquorice, we shall inform him what is the common Method, if he chuse to follow it; and shall lay before him the Reasons of our particular Rules on each Head.

In this let us not appear to any as being too minute and circumstantial. The Gardiner may

say we need not direct him how to draw his Line; but we shall answer, That it is not to him we are writing, it is the Farmer we are informing in the several Articles of his Profession; and so much of the Gardiners Business as is needful to him, we shall convey in few Words, in the which he will not think us too particular.

The common Way of planting Liquorice is with less Regularity, and at smaller Distances. In YORKSHIRE they allow nine Inches Distance in the Rows, and a Foot and a half between Row and Row; and in some other Places, they plant the Sets at about a Foot Distance every Way, but without any Regard to Lines or Rows.

There may be less Trouble in this random Method of Planting, but there is less Advantage. We have shewn the Farmer, that whatever Price he pays for Labour, is well returned in the Encrease, and it is in no Instance more true than here.

In the random Way of planting Liquorice, all that can be done afterwards to promote its Growth, is to hoe the Ground between; but in the Method of planting in Rows, the Earth may be dug at Times between them, which is of the greatest Advantage to the Growth; and those who have a mind, may plant or sow any slight rooted Crop between them. Of this we shall speak more at large hereafter, here we are only treating of the planting the Sets.

We have ordered a large Space, but the Growth will be large accordingly; any one who can count, will be able to say how vastly greater a Number of Liquorice Roots there will be in a Field planted at nine Inches, or a Foot Distance; but Liquorice is not sold by Number, but by Weight: and we will affirm, that the Quantity of Liquorice will be at the same Growth vastly greater in the distant than in the near Plantation.

We have ordered a setting Stick of a particular Form to be used for Liquorice, and with this Reason, that the Earth with such a one is found to lie looser about the Surface of the Root, which is a very great Benefit.

The common Instrument used for this Purpose is what they call a Dibble; this is the Handle of an old Spade, with a roundish Iron point. The Difference between this and the Instrument we have ordered, is much more in Effect than Form. The Disadvantage attending the Use of the common Dibble is this, that the Hole is made at once too large for the Set, because of the Thickness of the Instrument: then as the Dibble is round, the Earth is more apt to fall in than when it is made with a square Point. For this Reason when Liquorice is planted with the Dibble, the Planter when he has stuck the Instrument into the Ground, is obliged to work it round, in order to secure the Hole remaining open. This has two Disadvantages, for the Hole being too big at first, is thus made much more so; and the Sides are caked and hardened like the Surface of a Clay Bank.

When the Set is put in, a little loose Mould is thrown in about it, and a little more drawn over the Top; and this is all the Planter ever does, and often this but very slightly.

The



The Consequence is the falling of many Plants. The Liquorice set in this Case is in a kind of Well; which, when Rains come, naturally fills with Water, and this in the cold Mornings, that are frequent in the Beginning of MARCH, chills and damps it. Often it grows mouldy, and perishes; often it is checked in such a Manner, as hardly to recover it in a long Time; and very often it grows rotten in part, though it survives the Damage upon the whole; but this Damage continues with it in the whole Growth afterwards. This is the Occasion of the Failure of many a Liquorice Plantation, when the Owner attributes it to some very different Cause.

The better the Ground has been wrought, the less Mischief comes this Way; for the less Time the Wet can lie in the Hole, and the sooner the Earth moulders in at the Sides and fills it up, but still it is some Damage; and who would not avoid it when that may be done so very easily.

Our Instrument perfectly sets aside the Danger. It need not be nearly so thick as the Dibble, consequently the Hole is smaller, and better suited to the Slenderness of the Set; and there is this double Advantage in the square Shape of the Point, that the Earth remains firmer when the Hole is first made, without working it about for that Purpose; and the Angles being small, it the sooner breaks in and fills up; closing exactly about the Surface of the Root. To this Purpose it is always best, if the Wood Part of the Instrument be made square as well as the Iron Point, and with sharp Edges. This, in well wrought Ground, opens a Hole just fit for receiving the Set; every Part of which immediately on putting it in, breaks and closes about it; so that the whole Root is lodged in a Bed of fine, soft, and pliable Earth, and is in the midst of its proper Nourishment.



#### C H A P. LXVI.

##### *Of the Management of Liquorice when in the Ground.*

**W**E have left our Sets planted in Rows two Foot and a half Distance, and at a Foot and a half in each Row; their Tops furnished with good Eyes, and buried with about an Inch of good Mould. The Earth is finely to be raked, and the whole Surface of the Field left quite even; nothing appearing upon it. This is its Condition in the middle of MARCH, and thus it is to be left, expecting the Advantages of so regular and judicious a Piece of Husbandry.

The Heads of the young Plants will quickly appear, and they are to be left to themselves to make their Shoot.

Toward the latter End of Spring there will be Weeds in Abundance in the Intervals, and in the Spaces between Plant and Plant in the Rows. They will be less abundant afterwards, because the Liquorice will be better established; but these deep-rooted Plants do not draw the Nourishment away from those slight annual

Weeds, like those other larger Growths that spread out nearer the Surface.

The Weeds are at this Time to be destroyed, and though this might be very easily done with a Hand Hoe, yet there will be more Advantage in doing it by an Instrument which cuts deeper into the Ground.

The succeeding Operations of this Kind must be more deep than this first need be, but the best Way of doing this is by two Instruments; a Breast Plow, and a Hand Hoe of a particular Form.

The Breast Plow is to be of the common Shape, only set to cut a little deeper; and the Hoe for this Use should be narrow, sharp, strong, and moderately hooked. Both should have a good steeled Edge, which may be well sharpened; for the Ground in a Liquorice Plantation is so fine and loose, that there is nothing to blunt them, and they may be worked with great Ease.

The Breast Plow is to be pushed along the Intervals between Row and Row, coming near, but not too near to the Heads of the Plants; and the Hand Hoe is to cut up the Weeds between Plant and Plant in each Row. This is best done first, and the other afterwards; because otherwise a great deal of the Advantage of the Breast Plow in breaking the Ground, will be destroyed again by trampling over it in the Hand-hoeing.

The same, and indeed greater Care must be taken that the Tops of the Liquorice Plants are not cut off in the Handhoeing among them, than in the working of the Breast Plow between them; for the Danger is greater as the Strokes from the Hand are less regular. And this Caution is very necessary; for the cutting off the Top is a great Stoppage in the Growth of the Root.

When the Weeds are thus turned in, being Annuals, they will almost entirely rot, and serve as Manure. There will be no Roots of perennial Plants in the Ground, for they will have been picked out in the several Dressings; the Seeds of these Annuals are continually coming in by Accident into the Ground, and they must be destroyed as they rise.

As it will be some Time before any others rise to a Height after this first Dressing of the Ground, there must be Care taken of them when they do. Not that the Breast-plowing is to be repeated. It will be sufficient to send in Labourers with the proper Hand Hoes, and to have them cut up all that appear twice during the Summer; or if it prove a very rainy one, three Times.

This may be done at a very little Charge, and the only Care needful is to avoid cutting or wounding the Liquorice Plant. This will keep the Field clear during the Summer; and in Autumn, when the Leaves are fallen, it will be very well worth while to dig up the whole Ground one full Spit deep between the Rows.

Two Months after this digging, when all is smooth and even, let there be scattered a small Quantity of very rotten Dung all over the Field. This will cover the Tops of the Plants, and defend them from the Severity of the Frosts, that are



are now to be expected; and the Rains that fall afterward, will, in a Manner, dissolve the very Substance of the rotted Dung, carrying its Riches into the Heart of this fine loose Earth; for the full Nourishment of the Plants. Thus let the Dung lie till Spring, and then taking an Opportunity of a Time when the Earth is between wet and dry, and will work easily. Let the Intervals between Row and Row be all thoroughly well dug again one good Spit deep as before.

This will bury the rotted Dung among the Mould, where it will still work by its latent Fermentation, and break and divide as well as enrich it farther.

This done the Remainder of the Growth is only to be watched and hoed during Summer, and at Autumn the Earth is to be once dug between the Rows.

In this Manner the Liquorice is to stand three Years, and it will then be in the utmost Degree of Perfection.

It will perhaps fright the Farmer who has not been acquainted with the Profits of this Growth, to hear that his Land is to lie three Years for its Growth, and a great deal of Labour, and that of the most expensive Kind, to be used to it during that Period: but it is only to his being unexperienced that this Concern will be owing, for the Profits of a Field of Liquorice are so large, that they over-pay abundantly the Time and Expences, compared with any other.

#### C H A P. LXVII.

##### *Of the taking up Liquorice for Sale.*

**T**HE Time Liquorice Root takes from its planting, to grow to the utmost Perfection, is two Years and a half; that is, three Summers and two Winters, when we name three Years for the Time of the Grounds lying for it, 'tis including the Winter before the planting, when the Soil is preparing for the Reception of its Roots in Spring: this half Year must be counted by the Farmer, because it is as entirely necessary to be bestowed upon the Crop, as any Part of that wherein it is growing.

The Time of gathering the Roots for Sale, is late in Autumn. One reads in QUINCY'S Dispensatory, and other popular Books, one Direction for Roots in general; where they say in the same Words, one transcribing from another, Roots are best taken up in Spring, for Reasons obvious to all: if they had been as obvious to the Writers as they were expected to be to the Readers, I suppose those Gentlemen would have named them: we shall set the Farmer right in this Respect, by giving him Directions just contrary; and as we never suppose him to know more than he is informed, we shall give those Reasons on which the taking them up in Autumn is founded, and this the more at large, because they hold good in Respect of all other Roots.

Two Things are required in the Perfection of Roots, that they be full of Juice, and that the Juice be rich. On the first depends their good

Numb. XLIV.

Condition, and on the other their preserving that Condition. When they are flabby they are never full of Virtue, and when being plump and full their Juice is watery, it evaporates quickly, and the Roots lose their good Appearance; and what is of great Consequence to the Owner in most Instances, their Weight. Of this nothing can give a stronger Instance than Liquorice.

In order to try the Truth or Error of the popular Opinion, and to make the most of my Liquorice, I have taken it up at both Seasons, and tried the Difference; what I have found is as follows.

In Autumn the Root is full, plump, and very firm to the Touch: its Colour is deeper on the Outside, and the yellow within is clearer: its Juice is thick, and the Taste sweet.

In Liquorice taken up in Spring I observe that the Root is very plump and full, but it wants that Firmness which is in the other: it seems swelled, and is too tender and soft: its Colour is paler than it should be on the Outside, and it is of a muddy but pale yellow within. It is very full of Juice, but that is thin and watery, and the Taste is less sweet and less rich than in Autumn.

These are Reasons of great Weight why the Autumn should be preferred for the Time of taking up this Commodity: but these are not all. I have found by the same Experience, that Liquorice taken up at Autumn will keep a considerable Time without wasting; losing nothing, in a Manner, in its Weight; and retaining its full and plump Appearance; and at the same Time that it continues moist so long, it is little subject to mould or decay: on the other Hand I have seen, that Liquorice Roots taken up in Spring quickly change. They lose a great deal of their Weight in a little Time, and will grow flabby, and often wrinkled on the Surface; and though the Weather be frequently more favourable at this Time, than at the Fall of the Leaf, yet they will sooner grow mouldy.

This Experience shews; and I apprehend the Reason to be, that the Juices in the Root of Liquorice taken up in Autumn are rich, and of the Nature of the Plant, having in the greater Part been contained in its Vessels, during a considerable Period of the Summer. Whereas I imagine, those Juices which fill it so plentifully in Spring to be principally Water, just taken into the Root, and intended for the Support of the Stalk that is to shoot; a Part of them being in due Time to be converted to that rich and proper Juice, which swelling the Root in the End of Summer, contains in great Part the Virtues of the Plant.

These seem natural Reasons, and they are confirmed by Experience, for the Roots are every Way greatly preferable that are taken up at the End of Summer. In annual Plants which run to Seed, and in some of those perennial ones which bear a very great Quantity of Seeds, the Root becomes greatly impoverished after the Time of flowering; so that Autumn would be the worst Time of all for taking up such, but they are only a few, and Liquorice is not of the Number. The best Time of taking up such

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Roots



Roots is when the Stalk is just rising, for then they are full of those rich Juices which were intended to nourish the Stalk, Flowers, and Seeds.

Upon these Reasonings, countenanced by Trial, we recommend it to the Farmer who shall plant Liquorice, to take it up when the Stalks and Leaves are just withered and fallen. Then is his Time, for then it is fullest of Virtue, fittest for Sale, and if there be Occasion for keeping, it is in less Danger from thence.

The best Way is for him to have his Purchaser ready before he begins to take it up, and he will at this proper End of his Labours find, that if he have followed our Directions exactly, and spared none of the Expence and Labour we have recommended, the Produce will not be less than Seventy Pounds an Acre. This is a great Profit, and the Hazard is little or nothing.

To this general and particular Account of Liquorice, we shall subjoin a Letter written by a Planter of POMFRET, in the Year 1730, to shew the State of the Culture and Produce at that Time.

“ Planters of Liquorice divide the Roots under two several Denominations: those they call the Stocks, are the Tops or Crown Buds; from whence the Liquorice Root is cut off: the Runners are small running Roots, with Eyes about two Inches distant from each other, and run about two Inches below the Surface, three or four Foot long. These Runners (before planting) are cut into Lengths of about five Inches long, three Eyes to each Plant; though two Eyes, if they are strong and good, will do.

“ If the Ground has not been Liquorice before, it must be trenched over, two Foot and half, or three deep; the Roots in soft sandy Earth, will run six Foot deep: the Ground must be manured, or covered over with rotten Horse Dung, which must lie a Month, or more, to consume, before it is dug in. A little Lime is requisite, if the Ground be strong: but that is done after the Dung is dug in; and the Lime must be turned in about ten Days before planting; or else it will ferment, and heave and thrust the Roots out of the Ground again.

“ Before planting you are to line out your Ground, by a Rod of three Foot long, for each Bed's Breadth, and within that Space tread a narrow Alley, the Width of a Man's double Feet, or both his Shoes going one by another, moving strait forwards by the Line, which makes this Direction, and which is about a Spade's Breadth; with which also you are to throw up the Earth out of these Alleys, upon the Tops of the Beds; the Alleys to be about eight Inches deep. Then draw up the Sides of the Beds with a strong Rake; and (as Gardeners term it) cog the Beds with it so, as to make them round at Top: which done, lay the Beds in three Rows, one Row on the Middle of the Ridge or Bed; and the other two on each Side, a Foot from the Middle; and the Buds in the Rows at six Inches apart; first a Stock or Crown Bud, and then three

“ Runners betwixt; then with a large Dibber, made of the upper Part of an old Spade, eight Inches in Length, as is used to plant out Garden Beans, you are to plant out your Buds and Runners; and beginning at one End of the Ridge or Bed, take the Bud in your left Hand, and the Dibber in your right, make the Depth of the Hole the full Length of your Dibber; then force the Bud with your left Hand to the Bottom of the Hole; and you are to close it, by thrusting of the Dibber down again Sideways, pretty near the same Hole, as is done for Cabbage Plants, &c. And so working towards the left Hand, it will go on apace: those who practise such Works much, will do it very expeditiously.

“ The Sides of the Beds must be drawn up just after the Buds are planted, so as that the Holes which the Dibber left may be filled up, in order to cover the Roots, and keep out the Wet.

“ The first Year after Liquorice is planted, you may sow a few Onions and Carrots upon the Beds, not to stand, but to draw whilst young; and those but very thin: and as far as you can reach with your Hand, you may sow a few Radishes and Lettuce; and in the Autumn you may also sow Spinage, which grows very fine for the Spring following, and which may be cut before the Liquorice grows much, especially on the Ridge. The Profits which arise from hence may, in this one Year, be well computed at twelve Pounds ten Shillings an Acre; which we shall make appear by-and-by, when we come to state the Debtor and Creditor of this Commodity.

“ Liquorice at POMFRET, and other Places, is never in Perfection till it has stood three Years; and many there be that let it stand four, if it look heathful and lively: for Propagation, the Runners for Sets are sold by the Stone, at the same Price as Liquorice itself is at that Time; but the Stock or Crown Buds carry near double the Price. The Tops are annual, growing the first Year about a Foot high, the second Year two Foot, the third Year four Foot; and those Tops are always cut off in Frosty Weather; which keeps the Roots from tearing. The Green is best to be clipped off with Garden Shears the first Year, because of its being not so strongly rooted as afterwards it will, when it may be mowed with a Scythe. The Flowers come out in AUGUST and SEPTEMBER; but it very seldom, or never flowers till the Plants are three or four Years old: they are blue, and hang out in small Tresses, like the Senna's, but above three Inches long: the Stocks are like those of Raspberries, only smooth, and the Leaves like Seedling Ashes.

“ Liquorice is taken out of the Ground from MARTINMAS to the First of APRIL; but the latter Season is the best, both for the Liquorice and the Buds. When you take it up, sort the small from the great; from which last you are to dress the Chats with a fine Knife: then lay them in Sand, one Layer of Sand, and another Layer of Liquorice; but wet not the Sand with any more Moisture, than just  
“ so



“ so as that you can hold it in your Hand with-  
 “ out running out any Water; but it ought to  
 “ be Rock Sand, such as is dug out of Pits  
 “ about POMFRET, NOTTINGHAM, and other  
 “ Places. You are to order the Running Buds  
 “ or Runners in the same Manner, if early taken  
 “ up: but the Crown Buds will do, if thrown  
 “ in a Heap, and covered with Mats, &c.

“ The small Liquorice is, for the most Part,  
 “ dried on a Malt Kiln, after it is chopped short  
 “ with a Hatchet, or some other edged Tool, and  
 “ then grinded to Powder in a Mill; which is  
 “ the readiest Commodity of all: Or else it is  
 “ pounded in a Trough whilst it is green, and  
 “ put into a Mashing Tub, and mashed with  
 “ cold Water two Days together: then it is to  
 “ be wrung out clean, and the Juice boiled up  
 “ in an Iron Pot to a black Substance, called  
 “ SPANISH Liquorice, and at the Place before-  
 “ mentioned, where it is raised, called Lique-  
 “ rice Cakes. The Cakes they make at POM-  
 “ FRET are round and flat, with a Stamp re-  
 “ sembling the antient Castle of that Town, now  
 “ in Ruins. Within the Top of which Castle  
 “ there are two Acres of Land, at this Time  
 “ employed in the Propagation of this noble,  
 “ useful Plant.

“ It is further remarkable, That one Acre of  
 “ the Ground just mentioned, has yielded five  
 “ Hundred Stone Weight, which is generally  
 “ sold for three Shillings and Six-pence per  
 “ Stone, in one Crop: which must be accounted  
 “ good Advantage; for in three Years it a-  
 “ mounts to eighty-seven Pounds ten Shillings;  
 “ which is little less than thirty Pounds per  
 “ Acre, one Year with another. Nor is the  
 “ Charge of Tillage so dear, by a great deal,  
 “ as Hops and several other Improvements are.

“ Before I finish this Account, says this noted  
 “ Correspondent, I cannot but remark, that  
 “ about seven Years ago all the Liquorice at  
 “ POMFRET was monopolized and engrossed by  
 “ a Set of Merchants, &c. But the Engrossers,  
 “ by sending too great a Quantity together,  
 “ found, to their Cost, that it heated and smoak-  
 “ like a Hay-Reek put up too green. Which  
 “ I mention by way of Precaution to those that  
 “ raise great Quantities, who ought not to lay  
 “ above two hundred Stone in a Heap; for  
 “ though this may seem a great Quantity, yet a  
 “ much larger has been taken up, and transport-  
 “ ed, or kept in one Parcel.

“ When Liquorice is to be transported, all  
 “ that is designed for present Use is tied up in  
 “ seven or fourteen Pound Bundles, neatly rolled  
 “ up, and bound with Pack-thread. But the  
 “ only Way to be taken is to send it by Water,  
 “ and then to lay it in dry Sand, or any other  
 “ dry Soil, a Layer of Liquorice and a Layer  
 “ of Sand; so that the Sand runs all over  
 “ it, and amongst it; and so an Apothec-  
 “ ary may keep it good for a Twelve-month  
 “ in his Cellar. As for transporting of the  
 “ Roots for planting, if the small Eye Roots,  
 “ or Runners and Buds, were so transported in  
 “ Sand, it were better for them, than to be  
 “ sent naked; especially if it be a great Way,  
 “ and they are like to lie out of the Ground  
 “ long. If for a Journey of fourteen Days, they

“ may be sent in Bundles cut ready for plant-  
 “ ing; but if they are to be out of the Ground  
 “ longer, then they mould and rot. They  
 “ should not be mixed Head and Tail, if you  
 “ send them any Distance; but must be bound  
 “ up in little Bunches, as above, and tied all  
 “ one Way, for Readiness of planting. As for  
 “ the Crown Buds, they may be sent by Sea,  
 “ with a little Sand to them, being much hardier  
 “ than Runners are.

“ At the Town of POMFRET are about fifty  
 “ Acres of Ground, called Liquorice Garths,  
 “ many of them in small Apartments, which  
 “ entitle the Possessors to as many Votes for  
 “ Members of Parliament, as they are possessed  
 “ of those small Parcels of Land. All which  
 “ causes the Land Tillage to be very dear, the  
 “ common Labourers having one Shilling per  
 “ Day, and two Drinkings, which amounts in  
 “ all to at least fourteen or fifteen Pence per Day.  
 “ But there are many other Places, where it is  
 “ found by Experience, that there is as good  
 “ Liquorice raised, as at POMFRET, and where  
 “ Men and Buds are very easily procured.

“ As to the Expences of planting and pre-  
 “ serving of an Acre of Liquorice, the Price  
 “ of the Roots differ in proportion to the Price  
 “ that Liquorice bears the Year you send for  
 “ them: When Liquorice gives three Shillings  
 “ a Stone, fourteen Pounds to the Stone, then  
 “ Crown Buds give five or six Shillings per  
 “ Thousand; and Runners, cut into Lengths,  
 “ and tied up in Bundles, give three or four  
 “ Shillings a Thousand.

“ Old Planters of Liquorice reckon that  
 “ eighty Thousand of Plants will plant an Acre:  
 “ But computing twenty Plants to a Yard, and  
 “ four Thousand eight Hundred Yards to an  
 “ Acre, then an Acre requires ninety-six Thou-  
 “ sand, at one Hundred Sixty square Poles to  
 “ an Acre, thirty Yards to a Pole square, and  
 “ twenty Roots to a Yard; as may be seen in  
 “ the Example.

160 Poles in one Acre,  
 30 Yards in a Pole,

4800 Number of Yards in an Acre;  
 20 Roots to a Yard,

96000 Total of Roots to an Acre.

“ Now as they generally plant one Fourth of  
 “ Stock Buds, and three Fourths of Runners,  
 “ then there will be required,

|                                       | l. | s. | d. |
|---------------------------------------|----|----|----|
| 24000 Stock Buds, at 5 s. per Hund.   |    |    |    |
| when cheap, ————                      | 6  | 0  | 0  |
| 72000 Runners, at 3 s. per Hund.      | 10 | 6  | 0  |
| The Charges of preparing the Ground   |    |    |    |
| will be about ————                    | 4  | 0  | 0  |
| Weeding, the first Year, about —      | 4  | 9  | 0  |
| Weeding, the second Year, for it is   |    |    |    |
| not hoed, but weeded by the Grub      |    |    |    |
| and Hand, at ————                     | 3  | 0  | 0  |
| The same Operation the third Year, at | 3  | 0  | 0  |
| The taking up and bundling the last   |    |    |    |
| Year, at ————                         | 3  | 0  | 0  |
| The Charge in all, about ————         | 33 | 15 | 0  |

“ So



“ So that from what goes before, and what  
 “ will by-and-by follow, it is plain that an Acre  
 “ of Liquorice will, one Year with another, as  
 “ to the Debtor and Creditor of it, stand as in  
 “ the under-written Scheme, the whole being  
 “ taken at an Average for three Years.

## D E B T O R.

|                                                                                     | l. | s. | d. |
|-------------------------------------------------------------------------------------|----|----|----|
| Three Years Rent of the Ground, at<br>5l. per Acre                                  | 15 | 0  | 0  |
| The whole Charges of planting, weed-<br>ing, and gathering                          | 33 | 16 | 0  |
| To the Vicar for Tythe, at 2s. per<br>Pound, i. e. 10s. per Acre for<br>three Years | 1  | 10 | 0  |
| In all                                                                              | 50 | 6  | 0  |

## C R E D I T O R.

|                                                          | l. | s. | d. |
|----------------------------------------------------------|----|----|----|
| Five hundred Stone of Liquorice, at<br>3s. 6d. per Stone | 87 | 10 | 0  |
| A Crop of Onions, &c. the first Sum-<br>mer              | 1  | 0  | 0  |
| Some Winter's Crop for that Year                         | 2  | 10 | 0  |
| In all                                                   | 91 | 0  | 0  |

DEBTOR and CREDITOR ballanced.

|                        | l. | s. | d. |
|------------------------|----|----|----|
| Debtor to Rent, &c.    | 50 | 6  | 0  |
| Creditor in Goods-fold | 91 | 0  | 0  |
|                        | 40 | 14 | 0  |

“ Which is above sixteen Pounds a Year  
 “ per Acre clear Profit, for the raising of Li-  
 “ quorice.

“ To finish this Account it is plain, from  
 “ what goes before, that fifty Shillings an Acre  
 “ is allowed for the first Winter's Crop; but  
 “ if the Ground be sowed with MICHAELMAS  
 “ Onions, Carrots, Lettuce, &c. there seems to  
 “ be no Reason why all the three Crops may  
 “ not be worth half as much, at least, as the  
 “ one Summer's. And perhaps the same Me-  
 “ thods might be taken in other Winters, when  
 “ the Stalks are gone, as used to be done on  
 “ Beds, at least, as it's used in the Alleys of Aspa-  
 “ ragus Plantations. And by this it appears,  
 “ that if a Planter was possessed of a Hundred  
 “ Acres of Liquorice, and had a Vent for it,  
 “ it would bring him in near two Thousand  
 “ Pounds a Year, clear of all Expences. But  
 “ an Hundred Acres is too much for one Man,  
 “ or in one County; and so no more of that.

“ And thus, Sir, have I given you as good  
 “ an Account as I could, concerning the raising  
 “ of Liquorice at POMFRET, at least as good  
 “ a one as the Time you gave me would allow;  
 “ though I am, I think, pretty sure that there  
 “ is little or nothing omitted which is material,  
 “ and absolutely necessary to be known in this  
 “ Affair. I wish you good Success in all your  
 “ Undertakings,

And am, Your, &c.

J. P.

“ P. S. Our Liquorice Garths take up so many  
 “ Hands, at the Time of Year, that there  
 “ are scarce any Labourers to be got, at any  
 “ Rate, for other Works.

## C H A P. LXVIII.

## Of Saffron.

SAFFRON is a little Plant, not cultivated  
 for its Root, as the preceding, but for a  
 small Part of its Flower. It has an extremely  
 singular Aspect when growing, at some Times  
 of the Year having the Appearance of Grass,  
 from its narrow Leaves; and at the Season of  
 its flowering looking much more like a Garden  
 Flower than a Field Plant. It is very much of  
 the Nature of those Flowers called Crocus, from  
 its Latin Name; and it is itself not unworthy  
 a Place among the Ornaments of a Garden.

The Root of Saffron is roundish, single, and  
 large. It is one of those the Gardiners call  
 Bulbs, in all Respects resembling that of the  
 Garden Crocus. It is covered with a brown  
 Skin, and has a Tuft of Fibres growing from  
 the Bottom.

From the Top of this Root rise the Leaves.  
 They are numerous, narrow, and long, like  
 Grass Leaves, and of a dark green Colour.

The Flower is single, it rises at the proper  
 Season from the Midst of the Root, and stands  
 but a little Height above the Ground, but it is  
 very large. The Colour is a blueish Purple, and  
 in the Midst of it rise those particular Filaments,  
 or Blades, which are the Saffron.

We have given the curious Reader a particu-  
 lar Account of the Flowers of those several Plants  
 raised for Use in Fields, and heretofore described;  
 informing him of the Nature and Office of their  
 several Parts. This must not be esteemed a  
 Matter of useless Nicety. We are to give the  
 same Account now of the Flower of the Saffron,  
 and without so much Insight as the Farmer has  
 by Means of the former Descriptions, got into  
 the Nature of the several Parts of Flowers, it  
 would not be easy to acquaint him what the Sub-  
 stance we call Saffron, which sells at so great a  
 Price, and for the Sake of which the Plant is  
 cultivated, truly and properly is.

We have observed that the Flower of the  
 Saffron Plant is very large. It stands in a Kind  
 of Husk, rather than a Cup, which is formed  
 of one dry Piece, unworthy to be called a Leaf,  
 and is the Sort of Covering the Botanists call a  
 Spatha or Scabbard. The Flower itself is form-  
 ed of one Leaf, which at the Bottom has the  
 Shape of a Tube, but in the Body of the Flower  
 is divided into six large oval Parts, equal in  
 Size, and forming a Kind of hollow Vessel, all  
 being of equal Height and Breadth; within  
 this Hollow rise three Filaments, which are  
 shorter than the Flower itself, and have each a  
 dusty Button at the Top, of the Shape of an  
 Arrow Head. In the Centre of these, and of  
 the Flower, grows the Rudiment of the Fruit;  
 this is of a roundish Form. On the Top of it  
 stands one Filament, which is of the Length of  
 the three just described, but instead of a single  
 Button



Button on the Top, this has there three large Blades, which are rumpled and convoluted, and notched along the Edges; these are properly the Saffron. Some have said that the Saffron is the Filaments of the Flower, but that is an erroneous Manner of Expression; the Filaments are properly those three Threads which rise from the Bottom of the Flower, and support the Buttons, in which is contained the Dust for impregnating the young Fruit; but these three Blades are distinct from them in Shape, Nature, and Office. They grow from the Top of that single Thread which rises from the Fruit, and their Business is to receive the Dust from those Buttons of the Filaments, and convey it to that Thread through which it is to reach the Body of the Fruit, and penetrating into its several Cells, to impregnate the Seeds lodged therein. The twisted, curled, and notched Form of these three Blades renders them very fit for the Purpose of stopping this fine Dust, as it is shed on the bursting of the Buttons of the Filaments.

When this is done the Purpose of Nature is answered by these Filaments, the Buttons, the three Blades, and the single Thread. These all therefore decay and fall off, and the Body of the Flower with them. All that remains is the Rudiment of the Fruit, which now grows larger, ripens, and becomes of a roundish Form. It is composed of three Parts, and has three Cells within, in each of which there are several Seeds of a roundish Figure.

These are Parts the practical Husbandman has nothing to do with, for Saffron is propagated by Roots, not by Seeds, and his Care reaches no farther than to the ripening of those three Blades, which grow from the Thread of the Fruit. The Time when these are in their full Perfection is the Period for gathering them, and that is just before the Buttons of the Filaments burst to discharge their Dust.

Saffron is a Native of many Parts of EUROPE, but not of ENGLAND, though it lives very happily with us by Culture; so happily indeed that the ENGLISH Saffron is allowed to be the finest in the World: and we are supposed, from the Excellence of that Article, to be able to make the famous VENICE Treacle, in as great Perfection here, as they can in ITALY. They have the Advantage over us in the Vipers, which are one Ingredient in that Composition, and are more full of Virtue as well as of Poison in the hotter than the colder Countries, but we have as much the Advantage over them in Saffron.

The ALPS and PYRENEAN Mountains are the Places where Saffron is most frequent wild; we have a Plant not unlike it wild on the Sides of some of our WELSH Mountains. DR. DILLINIUS has given a Figure of it, in his Edition of RAY's Synopsis of the English Plants, but it is not the same with the true Saffron: its Flower, which is of the Size of that of Wood Sorrel, grows on a Stalk whereon are several short Leaves, this shews it to be essentially different.

We have observed that all Plants thrive better on being removed from a poorer to a richer Land, this is the Case with Saffron; for when brought from the bleak and barren Mountains of other Parts of EUROPE, to the rich and sheltered Plains

of BRITAIN, it out grows by many Degrees its natural Condition. To this is owing the Excellence of the ENGLISH Saffron.

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C H A P. LXIX.

Of the proper Soil for Saffron.

SAFFRON, although one of the most profitable Articles in the Way of the Husbandman's Profession, is at present cultivated but in few Places. Some particular Parts of ESSEX, and the Neighbourhood of a Town thence called SAFFRON WALDEN, in CAMBRIDGESHIRE, are in a Manner the only Spots of this fertile Island, where it is raised. An Attempt was made not long since in SURRY, but without any great Success: on enquiring of Mr. JAMES OGILVIE, who was a principal Proprietor, I found that the Ignorance of those who undertook the Care of it, was the great Cause of the Miscarriage. Let this caution the Husbandman who shall raise it in any new Place, yet it need not frighten him from the Design. Saffron is a nice Article, but with due Care it is less hazardous than many others; and we shall lay down the Principles and Rules for managing it from the Preparation of the Ground, to the delivering it from the Kiln; that none who will be attentive, and bestow upon it the Care so valuable and profitable a Crop requires and demands, can fail of Success.

Saffron delights in a warm flat Situation, but being accustomed to Exposure it will thrive better in open Fields than Inclosures. The Fences used about it are to be considered as erected for Defence, rather than Shelter, and are to be constructed accordingly; of these we shall treat hereafter.

The proper Soil for Saffron is a rich light Earth, improved by Manures; it may easily be too wet or too rank, but it cannot be too much enriched by mellow Dung, or too much prepared by Tillage. The better it is dressed and broken, the richer always will be the Crop.

A very rich Loam is an exceeding good natural Soil for this Growth, or a mellow Earth in which there is some Quantity of Sand, for that Soil alone is too often damp, and this is a Fault of the very worst Kind, as it will destroy and rot the Roots of the Saffron.

For this Reason also Care should be taken to examine the Bottom, for a less proper Soil, with a good Bottom, will favour the Growth more than a better, with such as is bad underneath.

We have seen that for the Culture of Liquorice there is required a great Depth of good Mould, and that a hard Gravel is the best Bottom: for Saffron this Depth is not at all required, for this Plant roots very shallow; but the Nature of the Bottom is of very great Consequence. A hard Gravel is proper for this as well as the other; but the worst of all others is Clay. If it happen that this lie under a deep Soil it is very prejudicial, but if it be covered only with a thin Coat of good Earth, though that Coat would be very sufficient otherwise, yet with the Clay Bottom it will by no Means answer. The Reason

son of this is, that these Clay Bottoms hold Water a long Time, which is of all Things most prejudicial to Saffron.

Next to a Gravel Bottom Chalk is accounted the most favourable, this is the Bed that lies under the Soil in many Places above SAFFRON WALDEN; and none succeed better in their Crops than those who manage that Kind of Land, other Circumstances being equal.

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#### C H A P. LXX.

##### *Of preparing the Ground for Saffron.*

SAFFRON requires to have the Ground prepared for it at some Expence. Indeed we see throughout the Course of the Husbandman's Profession, that the richest Crops require the greatest Preparation. The Trouble or Expence in this is nothing, to be compared with that for Liquorice, but it is very considerable in Comparison with that for many other Kinds; and we have observed before, that the Richness of the Crop will be according to the Manure and Tillage used on the Ground.

As Exposure is an essential Thing to the good Growth of Saffron, the open Fields do better for it than enclosed Countries. In those Places, as it is the Custom to sow two Years, and let the Ground lie Fallow a third, and as Saffron requires Land greatly in Heart, as well as carefully tilled, the best Method is to take a Piece of Ground that has been fallowed. This is the first Thing to be considered, the next is to take such a Piece to chuse as has had a Crop that has not greatly exhausted it before. There is no Growth that exhausts Land less than Barley; wherefore, when the Farmer has his Choice, let him prefer such Land to any other.

The Piece being fixed upon, the Saffron is to be planted in the Beginning of JULY, but the Preparation of the Ground must be begun in MARCH.

Toward the latter End of that Month let him begin by plowing, and to succeed perfectly he must set out right, plowing in a particular Manner: this will be more expensive, but that he is not to regard. The Ground must be plowed deep, and the Furrows drawn very close to one another. This is the Way to bring all the Parts of the Soil together, and to get them all quickly into a perfect and good Tillage, and this is what he is to attempt, at the setting out in his Work.

When the Soil is thus properly broken, and prepared for Manure, it is to lie six Weeks to enjoy the Benefit of the Dews, Rains, Sun, and Air. These, after so thoroughly plowing, will operate upon it very strongly; and it will, in the Period mentioned, be greatly broke and divided, and then is the Time of laying on the Manure. We have said before, that this Manure must be well rotted Dung, and the Reasons are of two Kinds; for first, if it were fresh, it would not mix with the Soil; and, secondly, in that Case it would be too strong and rank for this tender Growth. The Dung being of this Kind, such as has lain a good while, and been well turned; and the Land being rendered short and brittle

by the Exposure to the Air after the last careful Plowing, they will readily enough mix together; and it must be the Farmer's chief Care, that the Mixture is made in equal Proportion, one Parcel of the Ground having no more of it than another.

The proper Quantity of Dung is five and twenty Load to an Acre. The first Business when this is brought in, is to make the Labourers spread it very carefully and equally over the Ground, and it is then to be once more plowed: this is to be done in the same careful Manner, and it answers the Purpose of the Spade in Gardening, the Dung and Soil being prepared as before directed, they will be mixed as thoroughly by plowing as by digging by Hand.

In this Condition the Ground is to lie till the third Week in JUNE. It then begins to be Time to think of planting the Saffron, and the last Preparation for it is to be made by plowing again in this Manner. The Whole is to be very carefully turned and made fine, and between every Breadth of a Pole, that is sixteen Feet and a half, there is to be left a broad Trench. This serves to divide the Lands, and for a Place where to throw in the Weeds.

When this is done, the Ground is prepared and laid out for the Reception of the Crop, and nothing remains but to defend it from Cattle and other Injuries. Hedges are not required for this Purpose, because a slighter Fence will serve, and the Saffron will thrive the better for not being too much sheltered. The best Fence is a Range of Hurdles; or if the Farmer prefer it, he may run up a slight dead Hedge; but in that Case he must take Care to keep it tight at the Bottom, for not only Cattle are to be kept out, whose treading would be destructive, but Hares, which are very fond of eating the Saffron Leaves.

When the Farmer has thus prepared, lined out, and fenced in his Ground, it will be the Season for planting his Saffron. He will find that he has just made all ready at the Time when he is to lay the Roots into the Ground.

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C H A P. LXXI.

Of the Choice of Roots for planting.

SAFFRON is planted by the Roots, which are always to be had in the Places where it is cultivated, for it encreases greatly. Once in three Years every Planter of this Herb takes up his Roots, and an Acre is found to yield him from twenty to thirty Quarters of clean ones. From these, the others who want, are to be supplied; they are sold by the Bushel, but there is a great deal in the Choice of them. The Owner picks out the best for himself before he sells any to his Neighbours, and it is the Business of the Purchaser to get after this as good as he can.

The first Article in the Choice is, that they be perfectly sound. Some sell them rough, as they are picked up out of the Ground; but this is a slovenly and careless Method often injurious

to the Owner, and always hazardous to the Purchaser.

We shall therefore advise our Planter when he comes to this Article, to have his Roots picked and cleaned for himself; and we shall here direct him to purchase of such as have used the same Method. If he cannot, he must take them as they run, but they ought to come so much the cheaper; and he must pick and clean them, and examine what they are, before he commits them to the Ground: for we would have him proceed with Certainty, and there can be none where many of the Roots may fail.

There are two Reasons why the Roots ought to come much cheaper when bought rough, not only that many may be bad, but that there will be a great deal of Dirt, waste Matter, and old Skins that will fill up the Measure. However, if the Price be proportioned to the Condition, and due Care taken afterwards in examining and cleaning them; sometimes it may prove the best Purchase, for the careless Owner may thus sell his best Roots, and the new Planter may get such as he could not have bought from any one who had his Eyes open.

The Roots of Saffron are judged of two Ways, according to their Size and Weight, and to their Shape. The strongest Roots are always the best, and these are the largest and heaviest; therefore let the Buyer, in general, avoid as much as he can the little light skinny Roots; and when he looks over his Purchase, let him throw out the lightest, for it is better to lose them, than to be disappointed by depending on them.

Let him examine them by the Eye: they are best which when picked from the dead Skins have the smoothest and brightest Coat. Then let him lay them in his Hand and weigh them, the heaviest are best; and after this let him press some of them gently between his Finger and Thumb, and break others. In pressing they should be found firm and springy, for when flabby, and without Elasticity, they are in a Condition of Decay; when broken, they should be full of a rich fresh Juice.

Beside these Marks, there is a great deal in the Shape. The large and fine Roots are all rounded or flatted, and these small ones should be in some Degree of the same Form. They never can be so plump, so round, or so regularly shaped as those full grown ones, but the more they resemble them the better.

Many of them are long and run to a point: these are the most unlike the good Roots of any, and they are to be avoided accordingly. The People in the Saffron Countries distinguish them by the Name of Spiggots, and always reject them.

The Interest of the Farmer is, that as many as may be of his Plants flower the first Year, and on this depends the Neglect of the pointed Roots, for they never do so. The others often will flower when very small: so that although the Size be a great Recommendation, yet the Planter needs not reject a very small Root, provided it be of a right Shape, and fresh, plump, and thriving.



CHAP. LXXII.

Of planting the Saffron.

WHEN Saffron was less common, and the Roots were consequently more scarce, the Planters used to set them at considerable Distances; but this, though an Advantage to such Herbs as spread their Roots a great Way, is not essential to such a slight Bulb as that of this Plant.

This being now understood, and the Roots plentiful enough, for they increase at least one third in three Years in every Ground; they are now planted so near that about four hundred Thousand are required for an Acre.

This seems a prodigious Number, but as they are sold by large Measures, the Quantity that Way has not so vast an Appearance, sixteen Quarters at an Average contain about four hundred Thousand of them, and this is the most profitable Quantity the Farmer can plant.

We have brought him to the Beginning of JULY. He has his Ground perfectly prepared and fenced, and his Roots before him clean picked and examined, in this Proportion of a hundred and twenty-eight Bushels to each Acre. We are now to inform him in the most advantageous Manner of planting them.

A Piece of three Acres is a very advantageous Quantity, or he may make the Trial with a single Acre. If he chuse to keep more Land in this Growth afterwards, three Acre-pieces are the most proper, for they are found upon Experience to be the best and easiest managed.

The Instrument used for planting these Roots is of a particular Kind, but easily understood, and made from a short Description. It is a Spade made much narrower than the common Kind, and lighter; with a clean Blade and a sharp Edge: it is only to work in Ground before made perfectly fine, so that there will be no Occasion for Strength to cut through heavy Clods, as in the Work done by the common Spade. This Implement they call a Spit, or a Spit Shovel, and it is the only one needful in particular for this Article.

To every Man who has his Spit Shovel for opening the Ground, there are to be two Women allowed who are to have Roots in their Aprons. The Man goes first, and with his Spit raises three or four Inches of Earth, and throws it about half a Foot before him. The two Women follow, and dexterously taking the Roots one by one out of their Aprons, they place them in the farthest Edge of the Trench, which he makes in the Manner already mentioned.

The proper Distance of the Roots in this Row is three Inches: there is no Occasion for an exact Measure, Custom will lead the Women to do it very equally, when they have been once shewn what is right.

When one Row is thus laid in, the Spitter prepares for another, and at the same Time he covers these. The Method is this. He works cross-wise of the Ridge, and when he has thus gone once a-cross it, and the Roots are in, he begins from

from the Edge where he is, and works back again. He thus makes a new Trench as the first, and the Earth he throws up he turns in over the Row just planted. All the Care he is to take is, that he begin his Trench at such a Distance from the Edge of the last where the Roots are planted, that it may be as far from the Roots to be planted in the new one to those in the other, as it is from one to another of those Roots in the Row: for the Meaning of his Work is, that there be an Edge of a Trench left by his second Course a-cross the Ridge, just three Inches distant from the first planted Row of Roots.

As he turns the Earth of this Trench over the Roots of the other, he will leave the Edge to be planted just in a Way to be covered in by the Earth of the next Trench, and so on. This is what he is to do at every return, crossing the Ridge at every three Inches till the whole be finished.

The Women follow him in every Trench just as in the first, and they leave the Roots planted, but naked, for him to cover; the next Trench affords the Means of covering them: and thus when the Spitter has gone through one Ridge he begins upon another, and so goes through the whole Land.

When he has done, all lies tolerably even, and the whole Piece of Ground is planted with Roots of Saffron regularly, at three Inches distant every Way.

This is no difficult Operation, but we have told the Husbandman, that the whole Work in the raising of Saffron must be managed with exact Nicety and Care. Thus we shall tell him here, what the right and exact Method of the Spitter, and the Setters working is; and we recommend it strongly to him to have an Eye himself over it, and see that it be done accordingly.

We have mentioned to what Depth the Spitter is to throw up the Mould in making his Trench, and we have advised the making the Spit with a clean Blade, and smooth sharp Edge, that it may be done with Regularity. His Care must be to cut exactly and evenly to his Depth, and by that Means to have a level, sound, and undisturbed Bottom for the Roots to stand upon. If there be any haggling it will hurt their Growth; and as he knows on which Edge the Roots are to be placed, let him be very careful to keep the Bottom even there.

A good Workman with such an Instrument, and in such Grounds as we have described, will have a level Bottom as even as if it had been flatted by Art.

As to the Setters, there is but one Point in which they are to be careful; that is, to place the Roots directly and evenly upon their Bottom. It is in vain that an even Bed is made for them, if they are not placed evenly upon it. The great Care in the Art of Planting lies there, and if once so placed, the Earth that is so light in itself, and falls so lightly over them, will not disturb them.

When Things are done in Haste, they are seldom done with perfect Care. The Planters in the Saffron Countries are very ready and ex-

peditious, but the Eye of the Owner should be now and then upon them to see they do all properly. The Importance of the Crop is such, that nothing can be more weak than his grudging this little Article of Trouble.



C H A P. LXXIII.

Of managing Saffron while in the Ground.

THOUGH a great deal of Care is needful to the profitable Management of a Crop of Saffron, it is not a continual Care. We have seen the Roots got into the Ground in the Beginning of JULY, and the Planter has no Occasion to think of them again for two Months. His Fences are good, and his Roots well disposed and deeply covered. They are then to be left to Nature; what they have to do is gradually to swell, to open those Pores at which they are to take in Nourishment, to shoot some Fibres, and to receive the Juices of the Earth. This is a Work in which no Art of Man can assist them. Quiet is all they want, and the Course of Nature never fails, to be pursued regularly, when Man understands the Time, and does not intercept it.

In the Beginning of SEPTEMBER there is Reason to believe all that I have described is accomplished. Fibres are shot out, the Body of the Root is replete with Juices, and the Intent of Nature is to be pursued in making the Shoot.

Something may be done at this Time to assist this important Operation, but the Period must be exactly watched.

The Ground being cleaned, and broke on the Surface, will wonderfully assist the pushing of the Shoot; but if this be done too soon, the Earth that by its Lightness from the breaking, would so happily have assisted in the forming and sending up the Shoot will grow sad again; and, on the contrary, if the Operation be deferred too long; that is, till the Shoot is got to some Length in the Ground, though it does not appear above it; the Instrument employed to make Way for the Shoots will cut them off, and the Damage will be very great.

The Husbandman who is desirous to observe all the needful Cautions, may ask, How shall he know this exact Time? the Answer is easy. We have told him that in the Beginning of SEPTEMBER he is to expect it; and therefore let him then examine by opening the Ground. Let him take up two or three Roots in different Places, and he will soon see whether they be in a Condition for the Operation or not.

It is needful that he make the Trial in different Parts of the Ground, because from particular Accidents of Sun and Shade, or the imperfect Mixture of the Manure in some one Part of the Ground, if he made his Trial only in one Place, he might be deceived in judging from that of the whole Field.

The exact Condition of the Roots for this Operation, is when they have made their Shoot upwards, and it looks fresh, juicy and white, and

and has its Point within an Inch and a half of the Surface of the Ground.

This is the true and exact Time, for it will be out of the Way of Hurt by the Instruments; and yet so near the Surface, that the Dews and Rains imbibed so freely, as they are by the new broken Ground, will enrich and feed it so, that the other Inch and a half will very quickly shoot, and a few Days more bring it all over the Field up above the Surface of the Ground.

The Operation to be performed at this Time is a careful Handhoeing. The Hoes for this Purpose should be of the usual Breadth, but a little stronger, well steeled, and sharpened at the Edge. The Ground will be over-run with a young Growth of Weeds, but they will be all cut up and destroyed by this Operation.

The Hoers are to go in at one End of the Land, and Caution must be given them to tread lightly, and cut up carefully. Their Business is to cut about an Inch or less into the Ground, destroying all Weeds, and at the same Time loosening the Surface.

These Hoers are to be followed by Rakers, who must have the same Caution of treading lightly; and must be directed to rake off all the Weeds cut up by the Hoers, into the deep Furrow or Trench we before directed to be made at the Edge of each Land for that Purpose. These Rakers level the Surface again, so that when this Operation is over, the whole Field looks again like a Garden; with the Borders new dug up, quite plain and fine, and with no Plant upon it.

If there come gentle Showers after this raking, which is not uncommon at this Season, the Owner may account himself particularly happy. His Field will in that Case remain but a very little while naked; and he will have the Pleasure to see the Fruit of his Industry, in a rising regular healthful Crop, that promise a Profit which it would be very difficult for him to obtain from the same Expence, and the same Labour, employed on any other Article whatsoever.

This we may say to him in general to promote his Industry and Attention, that the more Pains and Care he takes about any Crop, the greater will certainly be the Return in Proportion; and that if there be some in particular which require more than others, they are those which best repay it.



C H A P. LXXIV.

Of the gathering of Saffron.

THE Husbandman will understand the Reason of that strict Caution we have given him, not to wound, bruise, or cut off the Top of the Shoot, when he shall be informed that this Shoot is the Rudiment of the Flower itself; whence all the Profit of the Crop is to be derived. An Injury to this would be irrecoverable, and it is therefore we have been so cautious in warning him to take Care of it, at the Time when he is hoeing the Ground, to supply it with

fresh Nourishment, and to destroy the Weeds that would else drain off a Part.

This Practice of hoeing is the more essential, in that there is nothing at this Time to receive the Nourishment which it supplies but the Flower, and no Part of the Flower shews so plainly the Effect of a plentiful Supply, as those three Blades which are the Substance called Saffron. They will shew themselves in the Flower, however poor and mean the Plant may be; nay whatever Disadvantages there are, these three Blades will always appear, not only in their due Number, but of their natural Length; but they will be thin and light in poor Ground, and they will grow fat, thick, and rich, in proportion as the Soil is naturally better, or is more improved by Art, whether the Method be by Manure or Tillage. Therefore this taking all Means to supply the Roots with Nourishment in the Beginning of SEPTEMBER, when they are rising to flower, is of all Things the most essential in the Management of Saffron; not only the Weight, that is, the Quantity of the Produce in pure Saffron, depends upon this Richness and Fatness of these Blades, but its Virtue in a great Measure, and its good Appearance in the Cake entirely. The Price of the Saffron therefore, as well as the Quantity, depend upon this Article. We repeat and urge it the more now, that we have an Opportunity to explain it as an Introduction to the present Chapter on the gathering, that the Husbandman may see the Necessity and Consequence of doing it thoroughly and carefully.

We have told him that a few Days after this hoeing will shew him the young Shoots of his Crop, and that their Regularity will make a very pretty Appearance, a very little Time more will shew him these Spires all opening into Flowers, and then the Prospect is agreeable indeed. The Saffron Plant is, as we have said, one of the Flowers called Crocus's; and it is inferior to few of them in Beauty. We see the Field is, according to our Method, planted with all the Regularity of a Garden; there is not left the Leaf of a single Weed in it, by the Hoers and the Rakers; and the Flowers now open in all their Glory. A Sight pleasing in the greatest Degree to the Owner, who with the Beauty sees the Advantage.

As soon as the Flowers are open they are to be gathered. The Reader has been informed already, that it is only a Part of the Flower which is the Saffron, that is therefore to be picked out and separated; but this is a Business that may be performed at Home; therefore 'tis not necessary to attempt it in the Field. The whole Flower is to be gathered there, and the rest is to be done afterwards.

The Sun and Air have a great Effect upon the Flowers, and even upon the Leaves of Plants; we see them firm and plump in all their Parts in a Morning, when they are full of the Refreshment of the Dew; at Noon, if the Sun have Power, they flag and grow lank; and toward Evening they begin to recover their Look of Health and Vigour again.

This natural Change, according to the Periods of the Day, affects nothing more than this Plant; and it affects no Part of this so much as the

Blades within the Flower. These are plump, turgid, and full of Juice in the Morning; they grow thin and poor by Noon, and they do but indifferently recruit themselves in the Evening, the Completion of this is reserved to the Dews of the Night; and therefore the early Morning is the only Time in which they are to be found perfectly fine. From this the Planter is to learn what is his true Time of gathering the Flowers, and how much depends upon it. He must send in a proper Number of Hands at Day-break into his Field, as soon as the Flowers of the Saffron appear, and these must gather till about Nine o'Clock in the Morning: they may, in Cases of Necessity, stay an Hour longer at their Work, but this is not so advantageous.

It is happy for the Owner that all the Flowers of the Saffron in his Field, do not appear together. We have observed, in cautioning him about watching the Time of hoeing, that little Accidents may occasion some Plants in the same Field to be earlier, and some later than others; and there will be the same Difference in their flowering. This is a great Advantage: it would be impossible, if they all burst forth together, that they could be gathered properly even by any Number of Hands; but these little Accidents which happen in every Plantation, protract the Time of flowering for several Days; so that those of one Morning being gathered, there is a fresh Supply open for the next, and so on, till the last have flowered.

It is farther happy also for the Owner, that there is no exact Degree of opening, at which these Flowers must of Necessity be gathered. The Saffron is best of all in those which have the Segments just separated at the Tops, that is, in such as are just opening into the full Bloom, but they may be gathered before or after this Period. In general all those Flowers which distinguish themselves by their full Colour, whether they are fading or not quite opened, are each Morning to be gathered.

Here, as in all other Parts of this Product, there is to be a great deal of Care used, otherwise there will be a great deal of Loss and Damage.

We have said that a proper Number of Gatherers must be ready at Day-break. Each of these must have his Basket on his Arm, and no other Preparation is necessary: but let there be Care taken who they are. Drunken Labourers are at all Times to be avoided, but they are to be dreaded on this. There is great Danger, that in gathering such a Part of the Saffron as is fit for that Purpose, more may be trodden down. The Want of Light, and the Carelessness of the Gatherers, are the two Things to be dreaded. Happily this Work falls out at a Time when People are sober, if they ever be so; but there are such thorough Sots that they should be examined. Though they are ready at Day-break they must not be sent into the Ground till it is well light: they are then to be posted in different Spots; and ordered to gather all the Flowers about them: first shewing them how near the Plants stand, and explaining to them the Mischief of trampling them down.

As these People pick up the Flowers one by

one, they are to throw them lightly into their Baskets. All the Art of gathering them is, that they lay hold on the lower Part of the Flower. The Reason of this is, that the Flower comes off more entire when taken by this Part; and there is also this farther Cause for not touching it near the Top, that the useful Blades grow in the upper Part, and might be injured by the Pressure.

Toward Nine, or half an Hour after Nine, as we have said, the Gatherers should desist. The Care of the Farmer in this Article, is to adapt the Number to the Work. If they be too few they must stay till they have done, even if it keep them within an Hour of Noon; but as there is a Loss to the Saffron in this, he should take Care to send in a larger Number next Day.

The next Morning all are to be ready at the same Hour, and the gathering is to be performed, in all Respects, in the same Manner, and this is to be continued regularly till the whole Quantity of Saffron have flowered, and all its Produce has been regularly collected.

While they are thus employed, from Day to Day, without Doors, there is to be no Idleness within. The picking is there to be going forward all the while, as we shall shew in the next Chapter.



C H A P. LXXV.

Of the picking the Saffron out of the Flowers.

EVERY Morning there will be a Quantity of Flowers brought into the House. The Baskets of the Gatherers, which have been lightly filled, are to be as lightly emptied, that no Injury may be done to those three Blades, which are the essential Part of the Flower.

The entire Flowers are to be scattered over a large Table, round which several Persons can sit in the Way to pick: four Forms are the best Convenience for that Purpose, and every Picker should be allowed free Room for the Use of his Arms.

The very same People who were employed in the Morning as Gatherers, may be set to work, during the rest of the Day, in picking, for they will not be wanted again for that Service till the next Morning; and he is an ill Manager, who does not contrive to have all the Saffron gathered in the Morning, picked during the Day.

The Method of picking is to take the Flower by the Bottom, between the Thumb and two Fore Fingers of the left Hand, and laying hold of the String that rises from the Embryo of the Fruit, just below where the Blades of Saffron grow from it, between the Thumb and Fore Finger Nail, to nip it off there; this Part is to be laid by, and the rest of the Flower thrown away as useless.

From time to time a Sweeper should clear away about the Pickers Feet, sweeping off the Flowers they have thrown down; and every Picker should have his or her own Dish, that the Owner may look on at Times, and see each does his Part in the

the Business, and that all do it right. I have seen great Irregularity when half a dozen People picked into one Dish, one laying the Fault, when discovered, upon another; but when each works separate, though all are at the same Table, the Sense that he is to answer for what he does, without Collusion, will keep him diligent.

The proper Part to be picked out, we have observed, is the three Blades of each Flower, and here we shall observe, that there may be Faults on either Side. That of Carelessness in Servants is most frequently the Case, they not taking out the whole Body of these Blades; and on the other hand, the Avarice of the Master makes him sometimes insist on their taking out more, nipping off a Piece of the Filament to which they grow, along with them, by laying hold of it too low.

The first defrauds him of a Part of his Quantity, which in an Article of the Price of Saffron, is greatly to be regarded; the other debases, in some Degree, the Value of the Saffron, while it adds very little to the Quantity.

In order to prevent Injury from the first, the Owner must have his Eye continually upon the Work, and sometimes look into the picked Saffron in the Dishes, and sometimes into the waste Flowers thrown down upon the Floor. There is a certain Way of knowing when the Work is rightly performed, this is by observing the Bottoms of the Blades. Let the Farmer remember the Design is, that these be all nipped off together, by pinching off the Top of the Filament just below where they are inserted. Now he will easily know if this be punctually done. For if the three Blades do not hold together, they have been taken off too high, and he has lost a Part of his Saffron: on the other hand, if they have been taken off too low, he will see a long String to which they grow, hanging from their Base, by which he knows he has more than he should, to the damaging, in some Degree, the Beauty of his Saffron. The Injury this Way is not very great, for the Colour of the Filament, though fainter than that of the Blades, is not distinguished easily, when it has been pressed and made up among them in the Cake; but the Buyers of this Commodity are now so good Judges, that he cannot be too careful.

It is proper to observe, that the Pickers have long and sharp Nails on the Fore Finger and Thumb of the right Hand, otherwise they pinch it off in an awkward bungling Manner, always crushing the Filament to which the Blades grow, and too often the Blades themselves. The People who expect to be employed on this Service, in the Saffron Countries, know the Use of preserving these Nails long and in good Order; and they commonly do it at this Season, but as every little Article in this Matter is of Consequence, the Owner will do well, especially when he shall propagate Saffron in a County where the Labouring People are not used to it, to bespeak his Gatherers and Pickers in Time, and caution them to let these Nails grow for this Service: it will answer their Purpose as well as his, for they will go through their Work with more Ease and Convenience to themselves, as well as more Regularity, by being thus provided against

the Time, with the natural Implement for the Business.

We have advised the Owner to visit his Pickers from time to time, and look carefully into their Dishes; but he may and ought also to look into the Flowers they throw down as useless, for he will discover, by the Condition wherein they are left, as well as by the Saffron picked out of them, the Honesty and Care of the Pickers.

If he see the Filament rising from the Embryo Fruit left at its whole Length, or very nearly so, and its End pinched off clean and sharp without bruising, he need not look into the Dish of that Picker to see his Saffron; for 'tis certain from this, that the valuable Part is taken out clean, entire, and well. On the other hand, if he find Parts of the three Blades remaining on the Top of the Filament in some of the Flowers, and a great deal of the Filament nipped away in others, he will know by what has been said already, that in the one Case he is defrauded of a Part of his Produce, and in the other he has a disadvantageous Addition.

It will be proper, for the distinguishing who works well and who otherwise, that he make every Picker throw down his Flowers in a Heap separate from the rest, as well as collect his Saffron into a particular Dish. By this Means he will not only see when Faults are committed, but always know who commits them.

This careful Inspection will also keep the People at their Duty, and make those honest through Fear of Detection, who would not be so in Principle. None but he who has seen and observed it, can conceive the Difference there is between Servants who work under the Eye of a careful Master, and those who are in the Pay of a negligent Person, that leaves them to themselves. To be rich the Farmer must be careful, and this he may set down as a certain Rule, that he will always have his Business done well as cheap as he can have it done amiss; the only Difference is his own Trouble.

CHAP. LXXVI.

Of the drying of Saffron.

WHAT we have described as the Course and Manner of picking Saffron for one Day, is to be considered as applicable to every Day. We have seen the People sent out to gather the Flowers that were risen in the Morning, unloading themselves two Hours before Noon, and employed in picking out the Saffron during the Remainder of the Day. The next Morning they are to be sent out into the Field, to gather a fresh Parcel of Flowers, and in the same Manner are to be employed the rest of the Day in picking them. Thus they are to proceed till the whole Crop of Saffron be gathered, and the whole Quantity of the Blades, or useful Part picked out. This is all their Business, so we shall speak no more of that Part; but we must consider what is to be done with this Saffron they have thus picked. We left it in their several Dishes, separated as clean, and kept as pure as the nice Eye of the Owner could obtain it, and

and we are now to inform him in what Manner, and by what Assurances it is to be prepared for Sale.

Rich and Fat as these Blades of Saffron are, they would soon dry if left to themselves in that Condition. This would rob them of a Part of their Virtue; and of a great deal of their Weight. The Owner is to sell them according to the Weight, and will have a Price proportioned to their Condition, with Respect to their retaining their Beauty and their Virtue. The Method of preparing them for Sale, so as to retain both these Properties, is by pressing them together into large Cakes, by the Assistance of a slight Degree of Heat. This forms them into compact Masses, which remain in a damp or soft Condition, retaining the full Flavour and Colour they had while in the Flower; in this Condition they will, with due Care, keep many Years, and it is thus the Druggist or Dealer expects to buy them; and he will always give a Price proportioned to the Degree of Perfection with which this Work has been performed. All that regards the Management of Saffron is nice, but this is the most nice of all. Some Heat is absolutely needful, but ever so little beyond the due Degree is hurtful; and a little Carelessness in the Management of it may burn the Saffron, after which no Art can ever bring it to be worth any thing.

The drying of Saffron is effected by Means of a Kiln, but this is of a very easy Structure, and small. We have said extream Care is necessary in the Management of this Commodity in every Article; but it will be seen, in the Course of the whole Preparation, that very little beside Care is necessary; therefore let not the Owner, who reasonably expects so large a Profit, spare that.

Before we enter upon the Management of the Saffron at the Kiln, let us acquaint the Owner with the exact Structure of the Kiln itself.

In the first Place, it should not be erected in a fixed Manner, because it will be most convenient to move it from Place to Place; and the Degree of Fire to be used in it is so moderate, that there is no Need of hard or heavy Materials.

First let the Husbandman provide a large, broad, and thick Plank. Let him support this upon four strong Legs, that it may stand firm, but not fix these to the Floor, nor the Plank to the Wall: let it be as a moveable Table, that he may carry it any where, as he shall have Convenience or Occasion. The Legs are to be short, and so contrived that they may stand very firm and steady.

The Outside of the Kiln is to be made of eight Pieces of sound Wood, about three Inches thick, in Form of a Frame upon the Plank.

This Frame is to grow gradually wider, all the Way from the Bottom to the Top, which is to be done by setting the Pieces sloping. Its best Breadth at the Bottom is about two Foot; and it should be near two Foot at the Top. The Height of it should be about equal to the Width at the Top. Two and twenty Inches high, and two and twenty Inches broad at the Top, and twelve Inches at the Bottom, is the usual Dimension of the Kiln for Saffron in CAMBRIDGE-

SHIRE; and by all I have seen, this Size and Proportion is so convenient, that it would be idle to think of making any Innovation.

On the Foreside of this Frame there is to be made a Hole eight Inches wide, and about four Inches above the Surface of the Plank. The Use of this is to introduce the Fire. And over all the rest there is to be a Covering of Laths, these are to be of the best and evenest Kind that can be procured; and Care is to be taken to lay them regularly, evenly, and pretty close together; they are to be nailed to the Frame we have just named, and then they are to be plastered over on both Sides. The Planks are also to be covered very thick at the Bottom with the same Plaster, which when dry makes a Kind of Hearth and Sides for the Reception of the Fire. A Hair Cloth is to be stretched over the Top or widest Part, which is what they call the Mouth of the Kiln: this is to be fixed to the Sides of the Frame, and also to two Rollers, or moveable Pieces of Wood, which are turned by a Kind of Wedges, and serve to strain and tighten the Hair Cloth on Occasion.

When the Kiln is thus far prepared, let the Husbandman lay in Readiness a couple of smooth and tolerably thick Boards, a little larger in Length and Breadth than the Top of the Kiln; and with these a clean thick Blanket, and a Quire of clean white Paper.

All Things being now in Readiness, let a Quantity of small and fine Charcoal be set by the Kiln, to make and keep up the Fire, as Occasion shall require. This must be clean and free from Knots, and in this Choice of it a great deal of Danger is avoided. The plastered Bottom and Sides of the Kiln will very well bear the due Quantity of Fire for this Purpose, nor will they be injured, whatever be the Condition of the Charcoal: but this is not the Case with the Saffron, that requires not only a very gentle, but a very equal Heat: it is very easily damaged; and no Fuel will keep up so equal and quiet a Heat as fine even grained Charcoal, such as is knotty, and of the Nature of what they call in LONDON old Coal, is fiercer, but that Quality is not wanted on this Occasion: there it burns irregularly, the Knots being always less charred, by Reason of their Hardness, than the intermediate Parts. From this it happens that the Fire, with the same Quantity of Fuel, is stronger at some Moments and weaker at others, which will affect the Saffron irregularly, and the knotty Parts often crack and fly, the Sparks from which will be apt to burn the Hair Cloth, and do other Damage.

Every thing being now in perfect Readiness, let the Husbandman proceed in this Manner. Let some Charcoal be lighted, and stand in Readiness to put into the Kiln: then let half a dozen Sheets of Paper be evenly laid upon the Hair Cloth: upon these let the picked Saffron be laid three Inches thick, and spread very evenly and regularly, but just as it comes from the Pickers Hands, and without any pressing; that is to come afterwards, when the Saffron is more in a Condition to bear it, and is to form it into those thin and compact Cakes in which we see it.

When the Saffron is thus spread to a proper
Thick-

Thickness upon the Papers, more Sheets of the same Paper are to be spread evenly over it; and then the Blanket is to be folded and doubled evenly, so as to bring it to a little more than the Size of the Top of the Kiln. This is to be laid upon the upper Range of Papers, and then the Fire is to be put into the Kiln. A few Pieces of the ready lighted Charcoal are first to be put in at the square Hole in the Front, left for that Purpose; and upon and about these are to be laid more Pieces, all of them of that even and smooth Kind already described, and all of them small, for large Pieces light unequally and burn unequally, so that it is never possible to keep the Fire at any regular Standard, which is a Thing very essential in this nice Work.

Chemists know this Article of keeping up a regular small Fire, by Means of small Charcoal, perfectly: none understand the Management of Fires like them, and therefore all others should learn of them on this Occasion. When they have very nice Operations to perform, they first break their picked Charcoal into Pieces of the Bigness of a Walnut, or thereabout: and this is the proper Method of acting in this Article of drying the Saffron.

As to the Degree or Quantity of Fire, it must be proportioned to the Quantity of Saffron to be dried. 'Tis almost impossible to convey any Notion of this Matter in Words, because we have not a sufficient Variety of them; all the Terms on this Occasion being comprised in two, great and little: the Fire must be of the latter Kind, but yet it must be enough to affect the Saffron; the best Method of acquainting the unexperienced in this, is to tell him what is the Design of it. The Thing to be done is not the drying the Saffron at once, for that would utterly spoil it, what is needful is to give it such a Degree of Heat at first, as will dispose it to grow damp. This is a certain Consequence of its being warmed and covered up, and this is what the People in the Saffron Countries call sweating of it. Now we have informed the Husbandman that this is the Degree of Heat required to be given it, he will not find it difficult to judge what is to be the Strength of the Fire. He will soon find, by the Condition of the whole, whether it be too much, too little, or just right; and will accordingly diminish, encrease, or continue it in the same State.

The first Hour is the most critical, the most nice, and most hazardous of all the Time of drying. We name this that the Owner may be properly upon his Guard.

The Fire is required to be stronger at first than at any other Time, though then but moderate, and let the Owner keep this in his Mind, for if because he hears it is to be stronger then than afterwards, he exceeds the Bounds of Caution, he will scorch all the Saffron, and it will be good for nothing afterwards.

What is called the sweating of the Saffron, is the raising some Moisture out of the Blades, by Means of a gentle Heat, which being detained by the Covering of the Paper and the Blanket, is returned upon the Saffron again, and there works by softening and mellowing the Blades; so that they are, after a Time, disposed to unite

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on a gentle Pressure, and to form together one compact Cake.

As this is the Intent, the Process is to be managed accordingly. When there has been such a Fire as serves to sweat them properly, continued for half an Hour, the Board we have before directed to be kept in Readiness is to be laid over the folded Blanket, and a large Weight is to be laid upon this. The mellow and soft Matter is now pressed by Degrees; and presently, from a Body of three Inches thick, as it was at first, is reduced to an Inch in Thickness.

The Fire is now to be a little lessened, and there will be enough to continue the sweating in a moderate Degree, for so much is not required now it is under Pressure, as was while it lay loose. The Heat and Pressure now operate together upon the damp Saffron, and the Cake continually becomes thinner and more compact, and is kept in a Condition of Moisture wherein it blends perfectly in all its Parts; so that it advances, by Degrees, toward the Condition, wherein it is to be finally made up; when this Degree of Heat has been kept up an Hour, the Husbandman is to turn his Cake of Saffron. This he is to do in the following Manner.

The Blanket and Board, with its Weight, are all to be taken off, and the Papers, which are then the only Covering of the Saffron, are to be raised up, loosening the Saffron where it sticks to them: this done the Papers are to be laid on again, covering the Cake as before, and then a thin Board is to be thrust in between the Hair Cloth of the Kiln, and the lower Parcel of Papers: these are what were first spread upon the Hair Cloth, and now lie close under the Saffron. When a Board is compleatly got under these Papers, the Cake of Saffron lies upon it, and may be easily turned. This is to be done carefully, and the whole, with the new spread upper Papers, is to be laid evenly upon the Hair Cloth of the Kiln; when that is done the Board that served for turning it is to be taken away, and the Blanket, doubled as before, is to be laid over it; the Board for Pressure is to be laid over that, and the Weight put upon it.

Every Thing is now in the same Condition as at first, except that the Cake is turned, and the same Degree of Heat is to be preserved in the Kiln, that there was the last half Hour, which is something gentler than the first half Hour. In this Manner the Cake is to lie one Hour: at the End of that Time the Weight, Board, and Blanket are to be taken off as before, and the Cake is to be raised, freed from the Papers, and examined. If there be no Mischief done now the Danger is over, for these two first Hours have all the Hazard; for the rest of the Time, as less Heat is needful, all the Care necessary is frequent turning.

We suppose the Cake of Saffron very well managed, and to have passed through the Operation of the two first Hours. It is then to be turned and laid on again, as before, and a gentle Heat kept up. This Heat must be preserved as equally as can be for two and twenty Hours, and the Saffron must be turned every half Hour during that Time: when this is over, the Saffron is in the right Form, and is fit for Sale. It is to be wrapped

wrapped up in a Bladder, oiled on the Outside, and that to be again wrapped up in Leather, and the whole in Flannel. This Care keeps it in the due Condition, till required by the Purchaser, it remaining moist, tough, and in perfect fine Condition; without the Loss of Colour, Taste, Weight, or Virtue.

This is sufficient, if there be a ready Market upon the Spot, but if the Owner be obliged to keep it some time, the only proper Security is to put the whole Parcel thus wrapped up and covered, into a Leaden or Tin Box, in that Way it will keep Years.

This is the whole Management of Saffron, and we apprehend we have delivered it in so plain a Manner, that if the most unexperienced will regard every Part of the Account, we may promise him he will run no Hazard.



C H A P. LXXVII.

Of managing the latter Gatherings of Saffron.

WE have told the Husbandman he is to send out his Gatherers every Morning, so long as any Number of Flowers appear upon the Saffron Field; and we have informed him that, according to various little Accidents, there will be some Plants forwarder and some later than the Generality of the rest, by several Days; and that even what may be called the Generality of the others do not rise together, but Day after Day.

On this depends a Distinction between the better and a worse Kind of Saffron: As to those Flowers which open before the Generality of the others, they are finer than the rest, for their Forwardness is owing either to the Strength of the Roots, or the particular Richness of the Spot of the Field where they stand. The Fineness of these Flowers consists in the Largeness and Plumpness of the Chives, and these Flowers may stand to be gathered with those of the succeeding Morning, if not enough to send in for alone, because those rich Blades will support themselves in good Condition for some time after the Flower is open.

These are the richer Kind of Saffron, and they are mixed with the rest, giving a Value to the whole.

On the other Hand there are Quantities of the Plants that standing on poor Spots, or under Shelter, or from the Smallness and bad Condition of the Roots, flower much later than the Generality of the rest. As the Blades constituting the Saffron are in the more forward Plants richer than the rest, they are in these poorer, and consequently it is not to the Advantage of the Owner to mix them with the rest of his Produce; because, as the first add to the Value of the whole, these would diminish the Price, more than their Quantity would make Amends. Neither could he conveniently do it, were his Interest on the other Side.

He is to look upon these late Gatherings therefore, as a particular Kind of Saffron, inferior to the rest, and consequently to be made up separately; but still it is very well worth his Care,

the very worst Saffron bringing a large Price in proportion to any other Produce.

We have explained to him what these last Gatherings are, and now shall proceed to direct him in their Management.

Let him make the Gatherers take up every Flower in these, as well as the preceding Mornings; and let him see all picked with the same Care as the others. When this is done, upon examining the Dishes, he will find the Difference between this and the former Parcels, they have been composed of large, fair, plump, and juicy Blades; but those in the Dishes now will be found small, thin, and much dryer; this is the Poorness of Saffron: it is always the Consequence of the Plant's not being well nourished. If at any Time the due Preparation of the Ground should have been neglected, every Part of the Produce would be of this poor Kind. We shall shew the Owner how that is to be managed, and the same Rule may serve him, if he is so unhappy as to have a whole Field in this Condition.

In this Case he is to prepare the Saffron in this Manner. When the Blades are picked out, and the Kiln is ready, he is to spread his Papers over the Hair Cloth, and then lay on the Saffron, as before directed, to the Thickness of four Inches instead of three, for the thicker this Parcel of the loose Blades is spread, the thicker will be the Cake: and there is nothing so advantageous to poor Saffron, as to be in a thick Mass. The thinner it is the sooner it loses its Colour and Moisture, there is none has so little, and therefore none can so ill spare it; and nothing betrays its Poorness, or reduces its Price, so much as the Dryness, or, as the Buyers call it, the Harshness of the Blades.

The Way to prevent this in the Cake is, to lay in enough at the first spreading. There is no Loss in this, for all that is put in remains; and 'tis as well to have two larger, as to have three smaller Cakes, while the larger are always, in equal Circumstances as to other Respects, the better.

When the Saffron is thus spread, the next Thing in the fine Kinds is to cover it with other Papers and the Blanket; but in this a little small Beer must be sprinkled in among it, from the End of a clean Brush, such as the Painters use.

The small Beer should be clear and stale, and a Bowl of it standing by, the Brush is to be dipped in, and when taken out and drained a little, the Handle is to be struck against a Stick, held in the Left Hand, by which Means the Beer that is left among the Hair will be scattered in very small Drops among the loose Saffron.

The Fire is now to be put in, and should be rather less than is used for the fine Saffron. The sprinkling with the Brush is to be repeated from time to time, till there be a good deal of Beer got in and perfectly mixed, and the Effect of the Heat begins to raise a little Steam from it. At this Time the upper Papers are to be laid on, and the Blanket upon them, and soon after the Board and Weight. Then the whole is to remain not an Hour, as the finer Kind, but only about five and forty Minutes, when the Board, Blanket,

Blanket, and Papers; are to be taken off, and it is to be turned as the other Kind.

The Quantity of Beer must be enough to moisten the Blades; without any running from them, and in this Management it will serve in the Place of that natural Moisture they should have; and they will sweat and soften, and blend together; in a Manner like the fine Saffron, which they would not have done otherwise for want of due Moisture. Many Things have been tried, but none answers this Purpose so well as Beer. I have known some use Water, but that subjects the Cakes to mould afterwards; others have used White Wine; but that draws away the Colour of the Saffron, and gives it to the Papers; others have used Ale, but that is too clammy; upon the whole it is a very nice Article, and of all the Things that have been tried, or perhaps ever can, there does not seem to be any that will answer so well as the old plain Country Practice of small Beer. This is a little strengthened beyond Water, and it has a little Clammyness, these are enough, it will not grow mouldy; it does not rob the Saffron of its Colour, and it gives a Toughness which is sufficient without overdoing that Article.

The Cake thus managed is to be dried, in every Respect, in the same Manner as that of the finer Saffron; but it is best to keep the Fire throughout as it begun, a little more gentle than for the other, and to let it lie six or seven and twenty Hours in drying.

The poorest Saffron, thus managed, yields a thick, massy, and firm Cake, all the Blades of which are well mixed and blended together, which has a deep Colour, a good Consistence, and strong Smell. It must be kept in the same Manner as the other, but the Owner is to expect about a fifth Part Abatement in the Price. The Difference will be more if he has not managed it well; but he may always sell it thus if he follow carefully these Directions, avoiding the too careless wetting it at first, and burning afterwards.



C H A P. LXXVIII.

Of certain Particularities in the preparing of Saffron.

WHAT we have said of the wetting the poor Saffron, may be continued to the whole Art of managing it: some have attempted to alter the Kiln, and introduce new and particular Methods for the drying and curing of the Cakes, but by all that I have seen they are worse than the old Way; and whatever judicious People I have known concern themselves with them, have returned to the old Practice at last.

The first Improvement that was attempted, was to lay a Net-work of fine Iron Wire across the Top of the Kiln, instead of the Hair Cloth. This was said to have great Advantages, of which the principal was this, that the Saffron dried faster, and with a smaller Quantity of Fuel.

This is true, but we have shewn the Husband-

man in many an Article before, that there are Savings which are the greatest Losses. As to the Fuel used in drying Saffron, it is too trifling an Article to deserve naming; and as to the other Article of Time, what is the bestowing a Day and Night upon a Parcel of a Comodity the Value of which is so great.

The Disadvantage that frequently attends this Method, is more than all the Good it can boast; by many Degrees, the Saffron is not enough defended from the absolute Force of the Fire, in this Way, but burns if there be not the most exact Care taken, and often in spite of all the Care that can be.

The Cake it is true dries quicker, but that is a Fault; it dries too quick, for the great Benefit of the caking this Commodity, is the Time it will keep moist and good in that Condition, and that is the Effect of that thorough soaking it gets in the slow drying. For these Reasons, tho' we have named the Iron Wire Way; for the Pleasure of those who love Variety, we advise the Husbandman to go on in the usual Manner, and prefer his Hair Cloth.

A second Improvement is, the using Linnen Cloths instead of the several Parcels of Papers that are laid over and under the Saffron; there does appear to be a Possibility of making an Advantage of this, for the Linnen falls closer, and presses more perfectly upon the Saffron than the Paper can do; but we are not got at the compleat Management. The Custom at present is to lay a Parcel of Papers upon the Hair Cloth, then to spread the Linnen over them, and upon that to lay the Saffron, which they cover with the other Linnen, and then lay on the Blanket; but there is an Inconvenience in this, for the Saffron dries too hastily at Top, and frequently has the Marks of the Cloth on both Sides, which hurt the smooth and rich Appearance of it; and are not easily got off again.

This is not to be rejected therefore, as the Wire Covering, but improved; and the Method I should propose to the Husbandman's Trial is this.

Let him have a few Sheets of thin fine Paper, such as in London is sold under the Name of thin Post, and some Quires of the common cheap Sort beside. I have found that for this common Kind, what are called the Outside Quires of printing Demy, are the fittest, they are large and smooth, and not too compact. These may be bought for about Four-pence a Quire, and if there be some imperfect Sheets among them the Matter is not much.

I would have the Husbandman set out with some Quires of this, a few Sheets of the thin Post, and a couple of Pieces of middling fine Cloth; each so large as, when doubled, to be of Size of the Hair Cloth. Let him also have his Blanket and other Matters in Readiness, as on other Occasions, and then let him proceed in this Manner. Having stretched his Hair Cloth, let him lay upon it some Sheets of the Demy Paper, on these let him lay one of his Cloths doubled; and when he has spread and stroked this smooth with his Hands, let him lay evenly upon it as much of the fine Paper as will just cover it, cutting it into Pieces for that Purpose, so as to make

make an even Bed for the Saffron, without Rumlings, or the Marks of folding.

On this let him lay his three or four Inch Thickness of Saffron, according as it is of a finer or an inferior Kind, and then let him cover the Saffron with another even Bed of single fine Paper, and lay the second double Linnen Cloth over that. Upon this let him lay on other Sheets of the Demy Paper, and then the Blanket. This done let him proceed in the Manner as already directed.

He will by this Means have the Advantage of the Linnen, which is a real Improvement without its Inconveniences, and he will press his Saffron into a fine Cake, without the Marks of the Texture of the Cloth.

A third Variation in the Management of Saffron at the Kiln, is the using a stuffed Pillow instead of the Blanket, for covering it. We name this under the Title of a Variation, because it by no Means deserves the Title of an Improvement: for it has not one Advantage over the other Method, but is in every Respect worse. The Pillow, in this Case, is to be made of Canvas, and filled with Straw. We need say no more about a Thing which we so utterly condemn.

C H A P. LXXIX.

Of the Papers used in drying Saffron.

WE are here to mention an Article dependent upon the Saffron Trade, in which the Owner has an Advantage, but in which the Abuses are so very great that, in Point of Honesty, he ought to be upon his Guard, to discountenance such as practise them.

We have observed that Papers are, in the common Way of drying, spread immediately under, and immediately over the Saffron. Now the Pressure which connects the Blades of Saffron into a firm Cake, cannot fail to dislodge some of their Juices: these are of a very rich Colour, and they stain the several Papers, penetrating through them as they lie one over another.

These Papers, especially such as have lain next the Cake, whether above or below, are strongly impregnated not only with the Colour, but the cordial Virtues of the Saffron, their Taste manifests this; and they very readily communicate their Colour and Qualities to Liquors poured on them.

The Distillers have several Cordial Waters, Usquebaugh of the yellow Kind, and the like, which the good old Receipts order to be coloured with Saffron, or more properly speaking, they order Saffron to be put into them for its Cordial Virtues, and the fine yellow Colour comes in Consequence.

The Distillers finding that there were Papers thus strongly tinged with Saffron, in the common Way of curing that Commodity, bought up these Papers and coloured their Liquors, saving the Price of so dear an Article as Saffron.

Had the Abuse stopped here the Matter had not been very great, but the next Step was, that

the Apothecaries, or rather those Retailers in LONDON, who call themselves Chymists; and very unhappily for the Buyer, rob the Apothecary of that Part of the Profits of his Profession, took these Papers into their Hands.

These Persons are ordered by their Dispensatories, to make a Syrup of Saffron, by infusing a large Quantity of Saffron in strong White Wine, and then melting the finest Sugar in it; but they pour a Pint of boiling Water upon a Couple of Sheets of this Paper, and sweetening the strained Liquor with two Pound of middling Sugar; they sell this as Syrup of Saffron. They are ordered to make a Tincture of Saffron also, of the finest Saffron infused in Wine, or any stronger Liquor; but for this Purpose these People only dip some Saffron Papers in Wine, or Spirit, till the Liquor is yellow enough, and this is Tincture of Saffron.

In the same Manner they use these Papers on many other Occasions, defrauding the Sick of that Help the Judgment of his Physician would have given.

To represent this Matter in its strongest Light to the Cultivators of this Commodity, I shall tell them what is absolutely a Fact, that the Saffron Trade is greatly hurt by this; and that it would be their Interest to join in a Resolution, that no Saffron Paper should ever be sold again. This can only be done by a joint Resolution to destroy all of them; and I am convinced that if they would have the Spirit, they would find the Price of Saffron rise in one Year, so as to make them Amends for what they would lose in the Sale of the Papers: the Demand must be greater, and the Trade would every Way feel the Benefit of it.

If this cannot be brought about, let me advise the Owner, for his own Sake and for the publick Good, to avoid those wicked Artifices which are used by too many, to give more Colour to the fainter Papers. This is done with other Ingredients, not with Saffron. I shall not name them, lest I give Instructions for a Practice against which I write: but certainly so much of this Artifice is used at present, that the Quantity of what are called Saffron Papers, used annually in LONDON, is six Times as much as all that are fairly produced in a Year. And this I mention as a farther Caution to the Saffron Owners, for it is striking at the very Root of the Trade. They are very sensible that the Demand is not what it used to be, and they may be assured this is the Reason.

C H A P. LXXX.

Of the Produce of a Field of Saffron.

THE first Year affords the Husbandman but a moderate Advantage in this Article, in Recompence for his Care and Expence; nay sometimes the Crop for that Season is scarce worth the Charge of gathering, picking, and curing; but he is to understand, that a Field of Saffron is planted for a three Year's Continuance, and that it is from the second and third of these Seasons he is to expect that great Advantage

vantage we have told him there is in raising this Commodity.

Nothing is more uncertain than the Quantity that shall be produced the first Year, sometimes from a Rood of the Land there shall not be gathered above a Pound or two of fresh Blades, and sometimes less than this; so that it will not pay Charges; but from this to about seven Pounds from the Rood, is the most general Produce: and at an Average, where every thing has been rightly managed, and the Season moderate, the Owner may expect about five Pounds. This will yield about one Pound of Saffron prepared, and ready for Sale.

This Produce of the marketable Saffron from the wet Blades, is to be reduced to great Exactness. In general, if the proper Care be used in the several Articles already mentioned, the Owner may thus expect one Pound of saleable Saffron from every five of the first Gatherings, and about a sixth Part less from the Pickings of the last Flowers; those who use Ale have found, that less than five Pounds of the poor Blades will yield a Pound, but this is owing to a Part of the clammy Moisture of the Ale being left in the Cake, and the Price is reduced more than the Encrease of Quantity compensates: on the other hand, six Pounds of the same fresh Blades go to make a Pound of the pure Saffron, in the Way we have directed; and this is a Proof the small Beer dries away, only serving to moisten and sweat the Saffron, and leaving little behind in the Cake.

The Time that a three Acre Field of Saffron will continue flowering, is in general from the first to the latest, about four Weeks. Three Weeks of this yield the fine rich Saffron, and the last Week only is what we call the last Gatherings, or yields the poorer Blades of Saffron which require that artificial Management we have named.

We have said that the great Profit arises from the two last Crops of Saffron; but the Owner is not to understand by this, that the Produce of those two Years is equal. The second yields a vast Quantity in proportion of the first; and the third is the richest of all. The Produce of Saffron by the Acre, taking in all the Methods of Advantage we have named, may be very moderately set down at four and twenty Pounds of marketable Saffron for the two last Years, reckoned together. The first we have seen bears no Proportion to these at all, but this, as we shall see hereafter, is a vast Profit: so that we have not exceeded the Bounds of strict Truth, when, in order to spirit up the Husbandman to make the Culture of it more universal, we have preferred it to most other Crops.

CHAPTER LXXXI.

Of the Management of the Saffron Field the two succeeding Years.

THE Owner of a new Saffron Ground, who has gathered his first Crop, is to know, that notwithstanding the great Expectations to

be formed of the two following, he has very little Trouble or Expence to come, the Charge and Labour of the first Year was his great Article in this Way.

We have conducted him to the planting, managing, and gathering his first Crop. The Roots retain their full Vigour afterwards, and the Ground having been so thoroughly prepared, will supply them with Nourishment without farther Assistance: all he is to do is to destroy such Weeds as would draw it from his Crop, and to preserve the Roots from Injuries as they lie in the Ground.

For the first Purpose he must have the Land hoed, according to the former Directions, and especially regard the Season for the first shooting of the Roots for flowering. This Time must be found by taking up a few as before, and the Operation performed in the same Manner: as to the latter Article, he has no Care upon his Hands but to keep his Fences good, that the Cattle, and particularly the Hares, be kept out, for they are very apt to infest the Saffron Fields in Winter.

As to the gathering, picking, and preparing the Saffron, it must be exactly the same in these succeeding Years that it was in the first, only as the Owner has been told that his Crop will be much larger, he must employ a greater Number of Labourers; and as he has more at Stake, he should not grudge to be more careful himself, in the over-looking every Part of the Work.

What we have said as to the preserving the Roots quietly in the Ground, will seem to contradict a Custom the Saffronmen have in some Places, of turning in their Cattle after the Leaves are fallen, to feed upon the Weeds that grow among them. But as much as our Directions contradict that Practice, just so much does that Practice run counter to Reason. In the first Place we have told the Owner, that nothing is of more Benefit to Saffron than hoeing; this is to be performed at a moderate Expence, and if repeated at proper Times there will be none of this Growth of Weeds, because it will destroy them: and in the next Place, if this have been omitted, and there be a Growth that may serve the Cattle a little, their Feet will disturb the Roots, and harden the Soil; so that it will much better answer the Purpose to send People in to mow them down occasionally, and give them elsewhere.

According to the Principles of Tillage, on which we have founded the whole Substance of this Work, nothing can be more beneficial to any Crop than the breaking and dividing the Ground while it is growing. Whatever Advantage there may be in this, the suffering it to be trod down by Cattle has just a contrary Effect; for as the one loosens and divides it, the other tramples it into more Compactness.

Upon those Principles, the longer a Crop is in the Ground, the more it will stand in Need of this Operation; and the richer that Crop is, the more it will deserve it: now Saffron, as we have shewn, is to stand three Years, and is one of the richest Crops a Ground can bear; for these Reasons hoeing ought to be frequently repeated.

The more Nourishment is drawn away by Weeds, the less is left for the Saffron; and the more compact and firm the Ground is, the less Benefit it receives from the Sun, Air, and Rains. Therefore let the wise Husbandman frequently hoe his Saffron Fields, he will so give a much larger Share of Nourishment to the Ground, and by destroying the Weeds that would devour it, he will make it all go to enrich the Saffron. The Richness of the Saffron goes, in a very great Measure, to the filling the three Blades, which are its great Produce; and in Consequence, the more he hoes the Ground the heavier they will be, that is, in the plainest Words, the more Saffron he will have at the Time of gathering. Nor is he to suppose this Difference in Quantity will be confined to any little Advantage. The Charge of hoeing more frequently than his Neighbours will cost something extraordinary, but of this he may be assured, that he will gain two Hundred per Cent. upon all the Money he shall expend in this Manner, in the Quantity and Excellence of his Saffron; this he will find by comparing the Produce of his Fields, with that of his Neighbours who have gone on in the usual Way. It is certain, upon the whole, that as there are few Articles in the Province of the Husbandman, that are so profitable as the Culture of Saffron, so there is scarce any in which there is Room for more Improvement. We see that the new Methods of Horsehoeing is not proposed here; but the common Ways of Management are only directed in a more profitable Manner. Let the Husbandman observe the same Conduct in every other Article, and he will not fail to enrich himself, to the Surprise, though not at the Expence, of his Neighbours.

C H A P. LXXXII.

Of breaking up a Saffron Ground.

THE Husbandman has been informed that his Saffron is to stand three Years, and he has been conducted in every Article of its Management during that Time; we are now therefore to suppose the third Crop gathered. The Plantation has done its utmost, and he is to break up the Ground. The Profits he has obtained would naturally make him very unwilling to give up such an Article of his Profession, but he is very far from being under a Necessity of doing it, he must take up his present Plantation, but he is in a better Way than ever to begin another. He is now in the Condition of the Person from whom he bought his Roots, and as he will be able to supply others with such as are to spare, he will know how to keep the best for himself.

The Nature of Saffron is like that of other bulbous Roots to encrease, and a Part of its Encrease he can now spare: but whatever may have been his Profits in his first three Years, he may promise himself much greater in the second Period; because he now sets out with more Knowledge than he had first, and he will be at all the needful Expence and Care with more Freedom and Spirit, from his Experience. As he will therefore not fail to chuse his Ground properly, and dress it

well, and will set out with such a choice Collection of Roots as he never could have got by Purchase, he may now look forward, and promise himself not only a much larger, but a much more certain and continual Gain.

He is now to set about the taking up and transplanting his Roots, and either using all to enlarge his Stock, or selecting what Quantity of the best he pleases, and disposing of the others as he at first bought them, to reap a certain Advantage.

If he chuse to enlarge his Plantations let him first separate his Roots, the finer from the inferior, in the same Manner as if it were for Sale; and let him throw away the worst. When he has made this Division, let him plant his large and fine Roots in one Field, and his smaller and inferior for a new Growth by themselves in another. He will find this much more advantageous than raising them together.

In his Design of enlarging the Saffron Plantation, let him consult all Particulars: that may be often profitable in itself, which is not practicable by particular Persons; and that may be profitable in one Degree, which is hurtful in another.

For these Reasons let the Farmer who is about to enlarge under this Article, consider his other Circumstances; let him see whether he must not neglect something essential, to fall so largely into this Particular; and finally, let him consider the Number of Hands that are wanted on this Occasion, and where he shall find them. We do not mean by this to dishearten him from the Design of enlarging his Saffron Grounds; but would have him set about it with Discretion. We are sensible that the great Profit may tempt him to exceed the Bounds of Caution, in following it; and for that Reason lay these Hints before him, that if he find he cannot consistently with his other necessary Affairs, manage a larger Crop than his former, he may content himself with the same Quantity of Ground, for that will now yield him a larger Produce and require a larger Number of Hands in proportion; or if he find he can have Opportunities, and Hands for a larger Quantity, that he may proportion his Undertaking, not to the Golden Expectation of Profit that is before him, but to the Nature and Convenience of his other Affairs: nothing would perplex him more than to have a larger Plantation of this Kind, than he found at the Season he could manage. And beside the Vexation of Mind, nothing would be subject to a greater Loss; for the gathering and curing of Saffron is a Thing that cannot be delayed when it is ready.

Hoping these Cautions may restrain within due Bounds, that Spirit of enlarging the Saffron Grounds, which so naturally rises after the gathering of the last Crop, we shall proceed to the Method of taking up, managing, and replanting the Roots.

The last Gathering being over, and the Saffron cured for Sale, let the Field be carefully plowed up. The Farmer must see that he send in a careful and honest Fellow for this Service, as well as a good Plowman. He must be told, if unacquainted with this Article, the Depth at which the Roots lie, and he must take Care to cut

cut beneath them that he do not injure them, and that he turn them all up: twelve or thirteen People are to be sent in to follow the Plow, and to pick up all the Roots they see turned up: each of these is to have his Basket upon his Arm, to toss the Roots into it as he gathers them from the Ground; first giving them a gentle Stroke against the Outside of the Basket, to strike off what may happen to stick in Lumps about them.

When the Plow has been thus carefully thro' the Ground, and the Roots collected after it are brought in, the whole is to be harrowed twice over with a good well tined Harrow. This will penetrate four or five Inches into this light Land, which is as deep as the Roots lie; and consequently it will bring up all, or the greatest Part of those which the Plow turned under the Mould. The same People are to follow in the same Manner as they followed the Plow, picking up every Root they see: and I have generally observed, that by that Time the Field has been twice harrowed, and the Harrow well followed each Time, there is hardly a Root left in it. These Roots are to be carried to the rest, and thrown together on a large Floor, where careful and experienced People, if such there be to be had, are to be set to pick and clean them: if not, 'tis no great Difficulty to teach the most ignorant; and whether these or the others are employed, it will always be proper for the Owner to have an Eye upon them.

What is to be done has been in general named before, it is only to clean the Roots from Earth, from dead Parts, and from old Skins or other Foulness; but this is the proper Time also to separate the fine from the others. The Cleaners should be told to throw them as they work into two separate Parcels; the large, plump and full into one Heap, and the smaller and leaner into another.

When the Roots are thus cleaned, they will keep good for some Time; but the most advantageous Method is to plant them out immediately, and that upon fresh broken Ground.

The Husbandman who has thus far pursued the Culture of Saffron, should use every Method to farther his Advantage, therefore what he should do is this. Knowing the Time when his Roots are to be taken up, he should have a fresh Piece of Land well chosen, and thoroughly prepared according to the preceding Rules, ready for the last working just at that Time. While his Roots are picking and separating, he should give it the last Plowing, and immediately after send in the Spitters and the Setters; giving to the last his choicest and finest Roots, with all the needful Cautions of placing them regularly and evenly on their Bottoms.

Thus pursuing the exact Course we have before laid down for him, he will in this choice Field have his finest Roots disposed with the greatest Regularity, in the most favourable Soil that is possible.

This Foundation laid for his great Crop, let him with the same Care plant his lesser Roots in his second Field; and he will be surprized at the Produce of the first, and perfectly satisfied with that of the latter.

We should observe here, that as there are certain Variations in the Manner of drying the Saffron; so there are in the Article of breaking up the Ground. Some instead of plowing use a particular Instrument called a Paddock: this is a kind of forked Hoe, or prong Hoe, with sharp and strong Points; but by constant Observation upon the Effects each Way, I altogether give it for the Plowing.

This Instrument is very apt to wound the Roots; it is manual Labour, and therefore comes more expensive; and it does not so perfectly clear the Ground.

C H A P. LXXXIII.

Of Saff-flower, or Carthamus.

WE here treat of a Plant less known than any other which comes under the Cognizance of the Farmer, nor is there any great Matter to be said in its Recommendation: however, as it is cultivated in some few Parts of ENGLAND, and very much in other Parts of EUROPE; and as there may be Circumstances that may render it advantageous to the Farmer to sow it, we shall not omit to give him such an Account of its Nature and Management, as may make him properly acquainted with it for his Purposes.

Saff Flower, or Carthamus, is cultivated for the Sake of the Flower, as the Saffron is; and probably the Culture of Saffron gave rise to this Article, for its Flower is used to some of the same Purposes, and is called for that Reason bastard Saffron.

The Plant however is utterly unlike Saffron; it is a kind of Thistle, and wherever it grows, whether wild or cultivated, it has very much the Appearance of a Weed.

It is an annual Plant. The Stalk is sturdy, robust, and four Foot high. The Leaves are large and broad, not divided or indented, but beset with Prickles at the Edges: the Flowers grow at the Tops of the Branches, into which the main Stalk divides towards its upper Part; and are a kind of large scaly Heads, somewhat resembling those of our Thistles, with a great Quantity of Threads issuing out at their Tops. These Threads are of a most bright and beautiful yellow, and have been supposed by some to resemble the Blades in the Flower of Saffron; but there is not much Likeness: it is for the Sake of these the Plant is cultivated principally, tho' the Seeds are also an Article in Trade. The Root is white and long, and it perishes as soon as the Seeds are ripened. Its first Shoot when sown, is in certain large broad Leaves, but these perish when the Stalk rises.

The Flower of the Carthamus examined more accurately, is found to be contained in a large common Cup: this serves for the several Flowers of which the whole Tuft is composed, and forms what we call the Head of the Carthamus: it is of an oval Form, and is composed of a great Number of Scales placed like Tiles one over another, and they have each the Addition of a kind of little Leaf of an oval Form. The whole

whole Tuft is composed of several tubular Flowers, each is formed of a single Leaf, and has the hollow narrowest at the Base, and wider all the Way to the Mouth, where it is divided into five, little, and nearly equal Segments.

In this Flower rise five short Filaments, and at the Tops of them stand so many Buttons, which are of a cylindrick Form and oblong.

In the Base of the Flower is deposited the Rudiment of the Fruit: this is very small and short: from its Top there rises a kind of Filament longer than the others. This is the Part to which the three Blades grow in the Flower of the right Saffron; but in this it is terminated only by a plain little Head, which serves to receive the Dust from the Heads of the short Filaments to impregnate the Seed.

When the whole tender Part of the Flower is faded, the scaly Head remains, and contains the Seeds. One follows every Flower.

Several other Species have been added to this, and called by the same Name, one with blue Flowers, and others with divided Leaves; but the true and proper Plant to be raised for Use, is that here described.

It is a Native of *ÆGYPT*, and several Parts of the East; and is cultivated in many of the warmer Parts of *EUROPE*: it thrives also very well in *ENGLAND*.

The principal Place where we have seen it in *ENGLAND*, is in some Parts of *NORFOLK*; but, if worth while, it might be raised in any other Part of the Kingdom.

Those who shall think it worth while to raise it, must observe the following Directions. In the first Place, let the Farmer take Care to have the Seeds from Abroad; and as often as he sows it let him get fresh ones, for they do not ripen well in *ENGLAND*. These may be had at a very small Expence, and with little Trouble. The Druggists sell them, but theirs are not to be used, for they are commonly old. But such a Quantity of it is raised every Year in *GERMANY*, that good Seed may always be had.

When the Seed is procured, the second Care is the Ground. The best Soil is a dry Loam, and it does not require a rich Piece of Land of this Kind; so that the Charge of this Article is not great, nor indeed in any other.

The Seeds are to be sown by Hand in a sparing Manner, on the Land in Spring, and to be harrowed in. When they have shot, and the Plants have some Strength, they are to be thinned. Hoers should be sent into the Field for this Purpose, and they should have Orders not only to cut up what Weeds have risen, but to thin the Plants themselves; leaving them at about a Foot Distance, and saving such as appear the strongest and most thriving. From this Time no farther Care need be taken of them: they will grow quick, and being strong Plants, and thus near to one another, no Weeds will be able to get Nourishment among them. Early in Autumn they will begin to flower; and then the Field will make a beautiful Appearance; there is nothing can exceed the Brightness and golden Hue of the Flowers, nor have we any Thing of our own Growth that comes near them. The Plants branch out to-

ward the Top, and the upper Part of every Branch is loaded with Flowers, so that the whole Field is covered, and as it were gilded with them.

The gathering of these Flowers so far resembles that of Saffron, that they are to be taken as they open; for if left for several Days together, they will lose their Colour, and that is in a Manner their whole Value.

For this Reason as soon as there is any Number of them open, the Pickers, who are in this Article the Gatherers also, are to be sent into the Field. The Flowers are not gathered there and picked afterwards, but the whole Business is done at once. The whole tender Part of the Flower is to be taken, leaving the scaly Bud. When those which are open are thus carefully picked off, they are to be spread upon a large Floor in an airy Place, out of the Sun to dry; and this is all that is to be done to them.

When they are dried in this Manner, they look of as beautiful a Colour as while growing, and they are ready for Sale without farther Care or Trouble.

Every Day or two the Pickers are to be then sent into the Field as at first, to gather the Flowers as they shew themselves, and this is to be the Method till the whole Quantity are blown; one Parcel being put to dry after another. The whole Parcel being thus prepared by a simple and natural drying, is ready for the Purchaser.

If the Season have been favourable, and the Crop have flowered early, some Seeds may ripen; but as this is such a great Uncertainty, there is no Dependance upon it; and the better Method is to grub up the Plants as soon as the Flowers are gathered, that the Land may be prepared for some other Crop.

The Dyers are the People who purchase the Flowers; some have idly supposed they were of the same Nature with Saffron, because they resembled that Drug in some Degree in Appearance; but it is so far otherwise, that as Saffron is a Cordial and Sweat, these Flowers are a Purge, and the Seeds a Vomit.

We have mentioned the only right and honest Use of the Flowers of this Plant; but there have been some, when it was more cultivated than it is at present in *ENGLAND*, who had a Way of mixing it with Saffron when they worked it in the drying.

How improper this was we may know from the Difference of the Virtues of one and the other; but there was another Reason why the Farmer never should have done this, which is, that it reduces the Price.

The thready Part of the *Carthamus* is narrow, harsh, dry, and paler coloured than the Blades of Saffron; therefore no Art can so blend them together, as to make them capable of imposing upon any but the ignorant: 'twas the inferior Sort of Saffron made up from the last Gatherings that they mixed up in this Manner, and it reduced the Price of this still lower.

One Reason why the foreign Saffron is held in so much Contempt in *ENGLAND* is, that there is too often *Carthamus* among it.

C H A P. LXXXIV.

Of Madder.

MADDER is cultivated principally for the Dyers, as well as the Carthamus; though there is in this Article also, a Consumption though comparatively small, among the Drug-gifts: but there is a great deal of Difference in the Demand; and as lightly as we have spoke of the other, we shall very strongly recommend this to the Farmer, because the Sale and the Profit are equally certain. 'Tis a vast Quantity of Madder that is annually brought into ENGLAND; and we have the more Reason to be out of Humour with this Importation, because it is brought from Places that have no Advantage over our own Fields; and frequent Experience shews, that the Plant will grow and thrive as freely and as well with us, as in many of those Places whence we have it, at a very considerable Price.

The Government at one Time interfered in favour of the raising this useful Product in ENGLAND, but it has been since almost utterly neglected.

Madder is a Plant of very little Beauty, and is more like a Weed than the Carthamus last described: it in some Degree resembles the common Cleavers, or Goose Grass, in its Manner of Growth, but that is larger and dusky coloured. 'Tis a rude irregular growing Plant. The Stalks are numerous, square, and commonly of a reddish Colour: they are weak, so that they lie upon the Ground in their lower Part; and in the upper, commonly intangle one with another. The Leaves are long and narrow, they stand six at a Joint; sometimes more, sometimes fewer, and are disposed like the Rays of a Star. Their natural Colour is a dusky green, but they sometimes, especially toward the lower Part of the Stalk, grow reddish. The Stalk is hairy, but these are more so: their Hairyness is not a woolly Down like that of some Plants, but is short, rough, and hard, so that they prick the Hands when touched.

The Flowers grow at the Tops of the Stalks, and small Branches; they are little, but very numerous, and of a pale yellow. The Seeds follow, which are contained in a kind of round little Heads; the Root, which is the useful Part, is extremely long, and of a beautiful red Colour: dusky on the Surface, but very bright within.

The Cup in which the Flower of Madder stands is very small, and stands upon the Rudiment of that little roundish Fruit in which the Seed is to be lodged: it is composed of a single green Leaf, hollowed and divided into four little Segments at the Edge.

The Flower is in the same Manner formed of a single Leaf, and is a little hollowed at the Bottom, and divided lightly into four Parts at the Edge. In the Centre of this rise four short Filaments, each terminated by a single Button or Head: from the Rudiment of the Fruit, which, as it enlarges a little, shews itself to be

composed of two Parts, there rises a single Filament called the Style of the Flower; this comes up in the Midst of the four Filaments just named, and is divided into two Parts toward the Top, each of which has a Button to it: this through certain imperceptible Apertures, admits the Dust from the Heads of the other Filaments for the ripening of the Seed Vessel, which then swells, and becomes a kind of double Berry: in each Part of which, or each Berry, is contained a single Seed.

There are two Kinds of Madder mentioned by those who treat of Plants, these are the six leaved Kind we have described, and one which has only four Leaves at a Joint, but the latter is not worth the Farmer's Notice.

In Places where the right Kind is commonly cultivated, there grow up a Number of Plants in waste Places from the scattered Pieces of Roots, and perhaps from the Seeds of those in the manured Fields: these wild Plants being smaller and poorer than such as have the Advantage of Culture, are distinguished as a separate Kind under the Name of Field, or wild Madder; but they are the same Plant under another Form by Accident. Therefore there is properly but one Kind of Madder, in the Consideration of those who would raise it for Use. 'Tis a Native of the East, and of some Parts of EUROPE: but its Roots in the wild State never arrive at any Thing near the Perfection of the cultivated, and that for this plain Reason; that in the latter Condition they run in a free, light, wrought Ground where nothing stops their Progress; and though they never attain any considerable Thickness, they run to a vast Length.

C H A P. LXXXV.

Of the proper Soil for Madder.

MADDER being one of those Plants that roots deep, and the Value of which is in the Root; the Soil for it should be deep and light. This is the principal Caution; for it will get Nourishment whether the Ground be richer or poorer, provided it be not altogether barren. A black Mould, such as is common in the Fens of ENGLAND, is very proper; and is the same Soil whereon they plant it in FLANDERS, whence we have our greater Supply. A loamy Soil that is in some Degree rich, and has but little Clay in its Composition, is also very proper; or a Mixture of Loam and Mould, as is very common in many Parts about the Edges of the Fen Countries.

There is no Part of ENGLAND where this Plant would thrive better than in these Places; for they have all the Advantage of the FLEMISH Grounds; and this farther Benefit, that they are drier. The FLEMISH often bursting their Roots by their over Moisture, or occasioning an expensive Manner of Dressing to prevent that Accident.

Whatever be the Soil for Madder it must be deep. We have observed it is the Nature of the Root to extend itself in Length, and that no Art can bring it to any great Thickness;

therefore a Depth of Soil is the most essential Point, that it may have Room to penetrate. There are usually produced a great many Side Roots, which spread along just under the Surface of the Ground. These are the Provision of Nature, for the Nourishment of the Stalk and Leaves, the great Root taking almost all the Juices it receives to its own Nourishment. Now as the Stalks and Leaves of this Plant are of no Use or Value, it is idle to provide for the maintaining them in Vigour at the Expence of the main Root. These horizontal Shoots never come to any Value themselves, and as they only take that Nourishment which should supply the main Root, the proper Course is to destroy them.

This Account of the Nature of Madder, and of the Soil that suits it, naturally points out a new Method of managing it to Advantage. Of all Plants that can be raised, none is so perfectly suited to the Horsehoeing Husbandry. The Soil it requires is such as perfectly suits those Implements; the Method of Horsehoeing, of all other Practice, will the most effectually and most essentially cut off the shallow and horizontal Roots; and as the main Roots are to be encouraged in their Growth to the utmost, no Method of planting can be so proper as that in Rows at a considerable Distance from one another. This directs in every Article the Horsehoeing Husbandry, as the Method for raising Madder to an Excellence, and perhaps such a one as it never reached any where yet in ENGLAND. The Culture of this profitable and useful Species, has been recommended frequently and strongly, and has been tried at different Times with different Success, but always with some Profit; we hope therefore that the Farmer will be encouraged, from what has been found of the Advantages of this Crop, in Methods less suited to its Nature, to try it in the Way we are about to propose; in the which it cannot fail of very well answering his Care, Expence, and Trouble; and according to which there is a reasonable Prospect of his enriching himself by it in a few Years Culture.



C H A P. LXXXVI.

Of the Management of the Ground for Madder.

MADDER is to be planted in Spring, but the Preparation of the Ground for it must be undertaken long before. Let the Farmer who intends to raise it, look carefully out for a Field that has a deep light Soil, of the Nature of either of those Kinds we have mentioned. When he has fixed upon the Field, in Autumn, as soon as the Crop is off the Ground, let him plow it up deeply and thoroughly with the four coultered Plow. Let him leave it in this Condition three Months, and then go over it with the same Plow once again: this will tear it up to a great Depth, and thoroughly break and divide it: let him then leave it to itself till the End of MARCH: at this Time let him look out for some Sets in some of the Garden Grounds

about LONDON, where a Quantity of Madder is raised for the Supply of COVENT GARDEN Market, and to dry for the Druggists, though not for Dyers. Having spoken about his Sets, let him, in the last Week in MARCH, send in his four coultered Plow again, set to go to the greatest Depth it can. As the Ground has been twice plowed before, it will very well give Way to this, and the third plowing being well and carefully managed, the whole Field will be turned up more than two Spit deep, and nearly as well wrought as by Hand with Spades, though at a vastly smaller Expence. The Sets are now to be taken off from the Sides and Heads of the old Roots, and the Ground is to be harrowed to lay it even. Then a Line is to be drawn along near the Edge, as in the planting of Liquorice; and the Sets are to be let into the Ground in the same Manner, at a Foot Distance from one another.

When one Row is thus planted, the Line is to be removed a Foot and half, and another Row planted, the Sets in this not being placed opposite to those in the other, but just over against the Middle of the Space between.

The Line is then to be removed to the Distance of five Foot, and drawn strait over the Ground as before, and a Row of the Sets are to be planted there; thus there will be a third Row at five Foot distance from the second, and at six and a half from the first Row: the Line is then to be moved again one Foot and half, and another, being a fourth Row, is to be planted opposite the middle Distances of the last. Thus the whole Ground is to be planted out. The Sets are to stand every where at the same Distance in the Row, as at first ordered; and the whole Field will be laid out in double Rows, with five Foot Intervals; the Space or Partition between one Row and another, of each double Row, being one Foot and a half.

When the Sets are all in and lightly covered up, let the Planter go over the Places where they stand, with a Garden Rake, and lay all level.

The Beginning of APRIL is a Season when Showers are seldom wanting, but if it should so happen that there are none, there must be the Labour of once watering the Sets. The best Time for doing it is on the third Day after their planting, and when this is done they may be left to Nature.



C H A P. LXXXVII.

Of managing the Crop the first Season.

THE Plants will now quickly appear, and as this is a Time when the increasing Warmth of the Season, and wet from the Showers, sets every thing on growing, Weeds will appear among them. As these must be principally Seedlings, for we suppose no Roots left in the Tillage, they will not at once over-run the proper Growth, because that is planted with good Roots; so that they need not be attacked so soon as ever they appear; but when they have got a little Height the Hand Hoers must be sent

sent in to clear the Partitions of them between Row and Row, not meddling with those in the five Foot Intervals, except just on the Outside of each Row.

This is to be done with Care and Management, and a great deal depends upon it. The Instructions to be given the Hoers are these. First to take Care of the Plants of Madder, which being set regularly, and now up at some Height, and being very different in their Aspect from the Weeds, cannot well be mistaken; all this however must be pointed out to them, and they must be strictly cautioned, for the Destruction but of a few of the Plants where they are set separate, and each intended for a large Growth, will be a considerable Loss to the Owner. This being pointed out to them, they are to be sent in with Directions to cut up all Weeds in the small Partitions, and break the Surface of the Ground as deep as they readily can with those Instruments; then they are to clear away between Plant and Plant of the Madder; and thence advancing to the Outside they are to cut up the Weeds, and break the Ground for about a Hoe's Breadth all along the Rows.

This done the Plants are to be left to themselves three Weeks, in which Time they will strike very strongly, and the Ground just about them will be very clear of Weeds, from the hoeing; but by this Time the Middle of the large Intervals will be full of Weeds of some Growth.

The Horsehoe is now to be sent in, and is to cut along the Middle of each Interval, to as much Depth as it can: this will thoroughly root up and destroy that Growth of Weeds, and break the Ground. The Weeds will, in great Part, be buried, and will become a Kind of Manure, for Weeds that cannot grow, soon rot at this Season, which is warm and wet; and the Ends of some of the longest Fibres of the Madder Roots will be broken off, and new ones will consequently grow in great Quantities from them, as is seen in cutting of the Fibres of Roots in the Gardener's Way of planting; and there will be a fine Quantity of fresh and free Earth for these new Roots, as also for what farther Shoots the others may make; and it will be full of Nourishment for them.

The System of Management in this Article of Madder, varies according to the Circumstances of Times, and it is fit we explain it to the Planter, that understanding the Reason of our Directions, he may observe them the more punctually.

We have told him that the main downright Roots are all that are of Value in his Madder Plants. Now the horizontal or spreading ones, that run under the Surface, are to be considered in two distinct Lights, as they are larger or as they are smaller, for at one of these Times they impoverish, but at the other they feed them; so that at one Time they are to be nourished, and at another destroyed.

It is while they are young that they are of Advantage to the main Root. This is their Condition in the present Instance, and it is therefore we are recommending every Method to feed and to encrease them; and on the other Hand,

we shall soon after take as much Pains to destroy them. The Part of the Madder above Ground, now though of some Bigness, is not so large as to demand any vast Quantity of Nourishment; the Root, on the contrary, is pushing downward, and grows the faster the more it is supplied by its Fibres, and the less it is drained by the Plant above.

This is the Case in many Instances at the Period of Growth whereat the Madder is at present, but in none more visibly. The first Nourishment the new planted Roots take in, goes to the pushing some Fibres from themselves outward, and a Shoot of Stalk and Leaves upward. This Shoot takes up the greater Part of the Nourishment in the first Days, but afterwards it grows slower, and requires a smaller Proportion of what is drawn. After this there is a Period when the main Root is taken Care of and supplied, that it may be able to send up Nourishment in Abundance to the Herb, when ripening its Flowers and Seeds, that being the great Purpose of Nature in all Plants: for this Purpose also in Madder a Number of long horizontal Roots grow out every Way under the Surface.

These horizontal Fibres we have named, and for which we are now so carefully providing by the Horse Hoe, are in Time to become those long horizontal or Side Roots. At present they are very serviceable, for they draw in Nourishment in vast Abundance; which being not demanded in that Quantity by the Plant in its present State, goes according to the Design of Nature, to the feeding and enlarging the main or downright Roots. The present Horsehoeing has vastly encouraged, filled, and encreased them; but the next is to destroy them.

Some Time after this Horsehoeing there will be Weeds again in the Partitions, and between Plant and Plant, for this is a Season that produces them very quickly: the Hand Hoers must be sent in again to cut them all up, and the Plants of the Madder being kept clear, will have a healthy Aspect, which is very essential to the good Growth of the Root, and which they would not have if choaked up with Weeds: some Weeks after this, when the Madder has grown to a considerable Size, let the Horse Hoe be sent in a second Time, with Orders to cut much nearer one Side, or one Row, alternately; by this Means all the large horizontal Roots on that Side will be cut and broken off, and only small ones will grow from the Ends of them, which will tend to the Service of the main Root again.

The Hand Hoers at this last Time need not hoe the Outsides of all the Rows, but only alternately of those near which the Horse Hoe is not this Time to come, for the next hoeing it is to take the others. This Instrument could not be brought so near the Rows while they were young, for fear of tearing up or burying the Plants, but they are too well established now to be in any Danger on that Head, especially as it is done only on one Side; for the Horse Hoe is to be carried along the farthest Side of the next Interval all the Way, in the Course of this Operation; so that it never comes near both Sides of the same Row.

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The Plants will immediately after this thrive surprisngly, and advance toward their flowering. There will need no more Handhoeing, for they will be now of such a Size and Strength, as to destroy all the Weeds about them; and the next Horsehoeing, which will be the last for the Summer, will compleat the Work for the first Season.

This is to be done as soon as the Weeds have got some Head again in the Intervals, for they will rise there though they be over-powered in the Partitions. The Instrument is now to be carried on the other Sides of the Rows alternately, so that now there will have been a thorough and deep cutting up of the Ground, near both Sides of every Row.

The large horizontal Roots, which would impoverish the main Roots, and be of no Value in themselves, are now broke and cut off on this Side also; and the main Roots, which are now large and strong, have all the Advantage of the Nourishment.

The Flower and Seed of Madder are wholly useless: and we have seen, on all Occasions, how greatly a Plant's running to Seed impoverishes the Root. This dictates a new Practice in the present Case, which is the cutting down the Plants just before they are breaking out into Flower.

Let this be done with Caution, and with Moderation. The Farmer is not to cut them down close to the Ground; it is enough if he stop their running to Seed, therefore all he has to do is to cut them off half a Foot below the Top. This will take off all the Flower Buds, and yet will leave enough of the Plant to draw up a great Quantity of Sap, and keep Nature in her proper Course. By this Means a vast Quantity of rich Juice, intended for the Perfection of the Plant in its Ripeness, will go to the main Root, for there will be no large Side Roots to take it up; and the Encrease in that useful Part will be very surprisng.

The Stalks will shoot out Side Branches from the Part where they were cut off, and from every Joint below, and will grow stronger for that cutting, and very bushy. Some of these will make an Attempt to flowering, and they may be left to themselves in it. The few Flowers that grow upon these Shoots are not like the full and universal flowering of the whole Growth, they will do neither Good nor Harm, and are not worth regarding.

The first Summer will thus pass, and the Plants not having drawn a vast deal of Nourishment upwards, the Roots will be greatly strengthened and encreased. This will be the Condition of the Crop at the Autumn of the first Season; and all that is to be done is in the same Manner to promote the Growth of the Root, during the rest of the Time it is to remain in the Ground, which is to the next Autumn. A Crop of Madder, though it remain but eighteen Months in the Ground, is to be accounted by the Farmer as a two Years Standard, because the Preparation of the Land takes up the other six. The whole Course is this, at Autumn the Ground is to be taken for it; during the Winter it is to be prepared, and in Spring it is to be planted: the next Autumn the Plants have had one Sum-

mers Growth, and they are to have another, for they must remain through the Winter; and the following Summer: and the Roots must be gathered in Autumn following, which is two Years from the Time of beginning the Preparation of the Ground.

In the usual Way of Management, when the Roots are taken up at this Time for Sale, another Piece of Land is to be sought out for the next Crop; but in the Method we have proposed by the Horsehoeing Husbandry, the same Piece of Ground may raise Madder for ever; and will be fitter for it than any other could.



C H A P. LXXXVIII.

Of managing a Crop of Madder the second Season.

WE have brought the Husbandman through the first Summer with his Madder, and have put him into a Way of making it much finer than it can be by the common Methods in that Time; at Autumn the Stalks die away, and the Weeds die with them: and from this Time, according to the Manner of speaking in the Madder Countries, they date what they call the second Season.

All the Winter the Ground is to lie perfectly quiet: in Spring, a Fortnight before the Plants begin to shoot, the Horse Hoe should be sent in to cut a deep Furrow in the Center of every large Interval, and the Hand Hoers to cut up those Weeds that rise in the Partitions. After this there will be no more Care needful about them, for the Growth will be too strong to suffer any Annoyance; but the Intervals will have Weeds, and should be Horsehoed just as in the preceding Summer, to prevent their farther Growth, and to give new Supplies of Nourishment to the main Roots, as well as to cut away and destroy the Side or horizontal ones.

This is to be done exactly in the same Manner as before-mentioned for the first Season, and therefore needs not be described more at large here. By this Means the Crop will proceed as it ought in every Respect; and this Season the whole Care will be over.

In Autumn, when the Plants wither, is the Time to take up the Roots, this must be done with Care and Circumspection, for the more they are broke in the Ground, the more of them is lost. The regular Method of planting them comes in here to be of great Use, for the People employed to take them up know where to look for them one by one, and where they may, and where they may not, work about them.

When they are all taken up they must be cleaned from Dirt, and after a Quantity of fine Sets are separated for a new Plantation, they are to be dried for Sale. The Dyer will be always a ready Purchaser, nor needs the Husbandman fear to overstock the Market. The Use of the Root is to die Reds and Purples, and as an Ingredient in many other Colours: and the Quantity imported annually from FLANDERS, GERMANY, and HOLLAND, amounts to fifteen, twenty, or twenty-five Thousand Pounds.

CHAP. LXXXIX.

Of planting a second Crop of Madder.

IF the Husbandman be satisfied, as he very well may with the Produce of his first Crop of this Root, he may reasonably promise himself much larger Advantages from the second, because he will have, 1. More Experience and Knowledge in all the Particulars relating to its Management. 2. A better Supply of Sets; and, 3. A fourth Part more Time for their Growth, which will be no small Addition to their Bulk.

In the setting out with the Undertaking, six Months were necessary for preparing the Ground; but the Land is now all ready: the five Foot Intervals have been, during the eighteen Months Growth of the preceding Crop, in a State of Fallow; and they are now ready to receive the new Plantation, so all that Time is spared.

We shall enter regularly upon the Progress of the Business: in the Beginning of OCTOBER the Ground is clear, and the Sets are taken from the old Roots. Let this Opportunity be seized, and while these Sets are preparing for the Ground, let the Ground be also preparing for them.

The Method of planting them is to be exactly the same as at first, in double Rows, with a Foot and half Partition between the two, and with a five Foot Interval between Pair and Pair of them.

The Rows are now to be planted in the Middle of the former Intervals, and therefore the Places where they stood before, will become the Middles of so many new Intervals; and enjoying a Fallow of two Years, with frequent Tillage during the whole Time, while the new Plantation is growing, they will after that be in a Condition to feed a new Crop, and so on from Year to Year; the same Field by this Management being enabled to bear the same Produce for ever.

While the Pickers are selecting the finest and strongest Sets under the Eye of the Owner, let the four coultered Plow be again turned into the Ground. It is now to tear up the Middle of each Interval, and is to be followed by the Harrow. By that Time the Ground is thus fit, the Sets will be ready, and the sooner they are let into it the better. These will be such in Strength and Goodness, as it would be impossible for him to obtain by Purchase, and they will strike immediately on being planted.

The Lines are to be drawn in the same Manner as for the first Plantation, and the Sets let in with the same Care. They will have Time to strengthen themselves for the following Winter, and will be so rooted and fixed in the Ground by the succeeding Spring, that they will shoot in a Manner not to be expected from a Spring Plantation.

As breaking and dividing the Soil to a certain Depth, is all that is required for the well nourishing of this Crop, the Ground will be now much better than at first, because it has been

Numb. XLVI.

continually turned and new broke during the Growth of the other; and as the Weeds which had lived upon it were always destroyed in their first Growth, and had rooted therefore but slightly, the whole Soil is full of Nourishment.

It may be questioned indeed, whether a Course of Tillage in this Way, suffers any Thing by those short Growths of Weeds or not; for as they exhaust little they return something, probably as much on being rotted in the Earth, and become a kind of natural Manure.

The Madder thus planted, is to be managed exactly as the first Crop: it is to be taken up just two Years after the Planting, and it will be found vastly preferable to the preceding. Some who have raised Madder, propose keeping it three Years in the Ground; but they certainly had not fairly and exactly tried the Difference. The Roots will gain something the third Year, but not comparable to the Disadvantage of the Loss of a whole Year's Time; neither are they always so good as they should be.

The second Autumn is the Season when this Root has arrived at its Perfection; and is the most profitable Time, on all Accounts, for taking it up.

CHAP. XC.

Of the preparing Madder Root for Sale.

THERE are different Ways of managing it when taken up; and different Forms under which it is brought to Market. But we advise the Farmer to think of nothing more than plainly drying it, and selling it entire, at least at first. It may be very well dried in a Hop Kiln, with a little Fire; and will always sell in that State.

The other Methods of managing it are by stripping off the outer Rind, then the second Bark, and so selling it in the three Forms, of the Rind, the Flesh, and the Fibre: and it may be also in either of these States ground, and sold in the Condition of Powder. For all these Purposes Labourers may easily be had from the Countries where the raising of Madder is common, and they will soon let the Owner into the manual Operation.

We are not against his undertaking all this, for we are aware of the Advantages, and would have him make the most every honest Way of his Crop: but this is not essential to the Traffick in Madder, and therefore we would not have him perplex himself by setting out with it.

Let him first raise his Madder as we have shewn, and sell it plainly dried; and after that, let him get proper People to superintend and manage the several Operations in the preparing the Root for more advantageous Sale; always having an Eye over the Work himself, and making it his chief Care to get himself as quickly as he can into the Secret of the several Practices: for if he omits this, he will lie at the Mercy of his Servants, which is a very miserable as well as hazardous Situation.

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thick, and white. The Stalk is very stiff, firm, and of a pale Colour, and is armed with Prickles. The Leaves that rise from the Root are very large, long, and of a bright Green, and are full of sharp pointed strong Prickles. Those on the Stalk are of the same Shape: they grow in Pairs, and joining one another at the Bottom, they surround it, forming a kind of Basin round about it, which holds at all Times a great deal of Water catched from the Dews and Rains. These Leaves, like the lower ones, are full of sharp Prickles. Toward the Top of the Stalk there rise several Branches, and these divide again into others toward their Extremities; and at the Top of every such Division there grows a large rough Head, fully as big as a Man's Fist, and of a somewhat oblong Form. This resembles the Head of the common wild Teafil, but is much bigger; and as it is covered in both Kinds with a Kind of small tough Prickles, these which stand nearly straight in the wild Kind, all bend downward in Form of Hooks, in the manured Teafil; and by that Circumstance it is that the Head is so fit for the Service of the Clothier: it becomes a Kind of Instrument for the dressing of Cloth, which for the Number, Disposition, Toughness, and Springyness of its Hooks, exceeds any Thing that can be made by human Art.

These Heads contain the Flowers, and Seeds of the Plant. The whole Head is a Kind of common Receptacle, holding a great Number of Flowers which appear in Succession for many Days: each of these Flowers has its particular Cup, but that is very small, and stands upon the Rudiment of the Fruit.

The Flower is small and hollow, it is a Kind of Tube, consisting of a single Leaf, divided into four Segments at the Edge, the upper one a little larger than the others. In the Centre of this rise four Filaments: they are very slender, and are longer than the Flower, so that they hang out; and each of these has an incumbent little Head, or Button, containing the Dust which is to impregnate the Seed. From the Top of the Rudiment of the Seed, and in the Centre of these Filaments rises the Style of the Flower: at the Top of which also is a Button pierced for the Reception of that Dust, and the conveying of it to the ripening Seeds: one of which follows every Flower, and is of a longish Shape.

There are three or four other Kinds of Teafil mentioned by the Writers on Botany, but they are of no Importance to the Farmer: this large Kind, which is a Native of ENGLAND, and many other Parts of the World; and is thus improved by Culture, is the only one he needs regard.



C H A P. XCII.

Of the proper Soil for Teafil, and its Culture.

TO know in what Soil Teafil will best succeed, the wise Method is to see where it grows wild. It will live in this State almost on any Ground, but it never is seen to

thrive so well as when it chances to stand on a Clay, among which there are some Stones.

Therefore if the Farmer who resides in the Neighbourhood of a Cloth Country, have a Piece of stony, clayey Ground, that is fit for little else, and is scarce worth the Charge of Manure, let him sow it with Teafil: he will be at no other Expence than a Couple of good Plowings, and he will have a Crop that will bring him a much larger Profit than he could make any other Way from such a Piece of Land, without a great deal of Dressing and Expence.

There is not any Plant whose Culture is less understood than this, though nothing is so easy. Most advise the sowing it in Spring, and consequently a great deal of Trouble in weeding; and some allow it two Years Growth upon the Land. These Methods lose Time, and create Expence, and nothing of this is necessary.

The Course of Nature in the Production and Growth of the wild Plant is this. The Heads ripen in JULY, the Seeds fall out, and take root in the Ground; they shoot up large Leaves which stand through the Winter, and in Spring the Stalk rises in the Midst of them; which, toward the End of Summer flowers, and is in its Perfection.

'Tis strange, that in the Cultivation of an Herb which is an absolute Weed, and the Method of whose Growth naturally, and without Care, is so obvious, more have not been led to follow the Path thus beaten for them; but in departing from it as ignorantly, as wantonly, have given themselves a great deal of Expence and Trouble.

'Tis certain, that if Teafil be sown in Spring, Weeds will rise with it, and must be held up, because they grow quick at that Time; but in Autumn they are not so numerous, nor of so quick Growth, and therefore the Plant will get the better of them. This is also the more the Case, because of the natural Soil of the Teafil, which being clayey, is one wherein few Weeds grow, and those not vigorously. On this depends the proper Culture of the Teafil, which we shall therefore direct the Farmer to observe in the following Manner.

If a clayey and stoney Soil be at hand it is best; if not, an absolute Clay will do. In either Case let him begin the Management and Preparation of it in Autumn, as early as he can: the sooner the better always; because the quicker the Seed is got, the more Strength it will have in the Shoot before Winter.

As soon as the Ground is clear of any other Crop, if it have had any on it, let it be plowed deeply with the four coultered Plow: after this let it be torn to Pieces with the great Harrow; and when it has lain a few Days, plowed deeply again; this last plowing is to be followed by another harrowing, and then it is ready for sowing.

While the Land is in this Preparation, let the Farmer seek out for Seed, and let him take especial Care that it be sound and new. The Quantity to be allowed is, a Peck to an Acre; and it is to be sown by Hand, and harrowed in,

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This done the Ground may be left intirely to itself till the Plants are up, and then there will require only one hoeing with the Hand Hoe for the whole Business.

When the Plants are up, and of such a Size that the strongest may be distinguished from the poorest, let the Hoers be sent in. They must have Orders to destroy the few Weeds there are upon the Ground, and to thin the Plants, cutting up the weakest and leaving the most promising, at about a Foot and a half Distance, this is all that needs be done. This hoeing, slight as it is, will dispose the Ground to receive the Dews and Rains; and the remaining Warmth of the Weather and following Showers, will invigorate the Roots, so that the Leaves will grow larger till they meet, and so cover the whole Field: after this no Weeds can rise; they will keep the Ground moist, and by that Means nourish the Roots: in Spring the Stalks will rise, one in the Center of each Cluster of Leaves, they will grow of themselves in their natural Manner, and toward the End of JULY will be full of Heads.

This is the Time of gathering them, and it is to be done by cutting off the Stalks, and tying them up in middling Bundles. These Bundles are what they call Staves of Teafil, and they require nothing more than to be dried, in order to be fit for Use.

If the Weather be fair they take no more Care as to the drying, than to set up the Bundles in the Field, leaving it to the Sun and Wind: if there be Rain they house them, and dry them with a little more Trouble.

The common Produce is about a Hundred and fifty, or from that to two Hundred Staves or Bundles to an Acre; and at the poorest Rate they are a very profitable Crop for such Land as they have grown upon, and the small Expence of raising.

The greatest Part of the Teafil raised in ENGLAND, is in YORKSHIRE, and in ESSEX; the Heads being dried, are used to lay the Nap of coarse Cloths, or others, in the first Manufacture.

Those who chuse the Method of sowing in Spring, must do it exactly in the same Manner as has been directed for the doing it in Autumn, but the other Way, except under very particular Circumstances, is greatly preferable.

If any chuse to cultivate this Plant in the Drill and Horsehoeing Way, there is no doubt but it will answer very well, for nothing can furnish it so plentifully with Nourishment as Horsehoeing; and in that Way also the Surface of the Ground would not be at any Time so perfectly covered by the Leaves as it is in the other, because the middle Part of the broad Intervals would certainly be free.

In this Way of raising Teafil the best Practice would be to plant it in double Rows, with two Foot Partitions, and five Foot Intervals between Pair and Pair of Rows: the Number of Plants would be less upon an Acre in this Way, but probably the Number of Heads would be greater, because each Plant being so well nourished would afford a larger Number, and certainly they would be better in their Kind.

C H A P. XCIII.

Of Aniseed.

EVERY one knows what Aniseed is, and how great a Consumption there is of it. We receive it from the LEVANT, where it is cultivated in the GREEK Islands, and some other Places; but it may as well be raised at Home. Not only we are remiss in this Article, but all other Nations, for the World is in a Manner supplied from those few Places: there is no Reason the Backwardness of others, in what regards their own Interest, should be a Rule for us to be also backward: not only Reason and the little Experience we have in Gardens, shew that the Plant will perfectly well live with us; but the more full and perfect Experience of the Fields where it has been sown, and has come up, and grown to a perfect Maturity.

Let the Farmer be informed of every thing it is in his Power to raise upon his Land; and then let him use his Discretion, to suit the Crop to the Condition of his Land, and Circumstances of his Farm.

The Plant which produces this Seed, and is called the Anise, and vulgarly the Aniseed Plant, is not altogether unlike Parsley in its Manner of Growth. 'Tis about the same Height, and branches out much in the same Manner, and carries its Flowers and Seeds in the same Way in Tufts.

It grows to two Foot and a half in Height. The Root is long and white, but what is most singular in it is, that there is a great deal of Difference in the Shape of the Leaves, those which rise first from the Root, are composed of roundish Parts, and those on the Stalk are more divided; 'tis these latter that have most the Aspect of the Parsley Leaf, and they are of a pale Colour. The Tufts of Flowers are moderately large, but the separate Flowers are small, they are white, and are succeeded each by two Seeds which grow together.

The whole Tuft of Flowers, which is what is called an Umbell, has no surrounding Leaves as those of many other Kinds have; and the separate Flowers whereof it is composed, have scarce any visible Cup. Each Flower consists of five little Leaves, which are of an oval Figure, and bend backward: in the Center rise five slender Filaments, each having at its Top a little Head or Button; among these grows a single Filament, divided into two at the upper Part. This is the Style of the Flower, it grows upon the Rudiment of the Fruit, which is composed of two Seeds joined close together, which ripen and separate when the Flower is fallen.

C H A P. XCIV.

Of the Cultivation of Aniseed.

ANISE is to be sown in Spring, but the Ground must be well prepared for it before Hand. Therefore let the Farmer who intends

tends to raise it; look out for a proper Piece of Ground during the Summer, that he may be ready to go to work upon it in Autumn.

The proper Soil is a dry rich Loam; that is, such a one as has a good deal of Sand, but little Clay, and a good Quantity of fine Mould in its Composition.

The best Situation is in a warm Valley, where the Place is well sheltered by Hedges, and is not in the Way of Wet; for Anise is a tender Plant, and will by no Means bear Water to lodge about the Roots.

Such a Piece of Ground being chosen, let it be well plowed up in Autumn, and a Quantity of half rotted Dung strewed over it. Let the plowing be repeated two or three Times between that and Spring, that the Manure may be well mixed among it; and then let it all be harrowed fine, till it be as level and smooth as a Border in a Garden. It is then in a Condition to be sowed, but the Weather must be watched. Anise is a quick growing Plant, so that it need not be hurried into the Ground in the very Beginning of the Spring at all Adventures; the Danger to which it is liable is altogether that of the cold Rains, which sometimes fall early in this Season, and it may be easily guarded against these, by keeping the Seed out of the Ground till the dangerous Period is over.

The Farmer may be discouraged by what he meets with in some Writers of Credit on this Subject, who talk of the great Tenderness of Anise, and the Difficulty of raising it: but it is all owing to their having sown it too early. They direct FEBRUARY as a proper Time, whereas it will succeed very well if sown in APRIL. GERARD, an Author of Credit, might have taught those Writers better, he says he had frequently sown it in his Garden, where it always grew very well; and perfectly ripened its Seeds, if the Weather proved any thing favourable.

There is therefore no Difficulty in raising Anise in ENGLAND, and very little Hazard, unless what rises from Ignorance: this is worth searching to the Bottom, because it may prove a very valuable Commodity: the Price is not great as we import it, but when we consider the vast Quantity of Seed which all these umbelliferous Plants bear, we shall find that it will amount to a very considerable Value from an Acre.

The Ground being ready, the next Thing the Farmer is to do is to see that he get good Seed, the Soundness is one great Article, and the Freshness is another. If he buy such as is faulty and decayed, he will have a poor Crop, because one half of it will never sprout; and if it be old Seed, though good and sound, yet it will from that alone be made very inconvenient to him, on Account of the late shooting. As we have advised him to sow it late in the Spring, it should rise soon, or he should be prepared for its lying longer in the Ground, by knowing it would do so, that he might sow it something sooner. Gardeners know that old Seed, though good, always lie longer in the Ground than newer of the same Kind, and this is particularly so in Anise.

Therefore let the Husbandman be very careful in examining the Seed he buys; the best Rule that can be given him is, that its Weight and

Cleanliness are Tokens of its being sound, and the Brightness of its Colour shews best its being new.

The Land being prepared, as we have directed, the Seed is to be sown lightly and sparingly over it; and when it is come up it is to be hoed by the Hand Hoe, the Hoers cutting up such Weeds as have risen among it; and thinning the Plants to about six Inches Distance every Way.

In this Condition they are to stand till they have flowered, and the Seed is ripened; and the Time for gathering them is just when it begins to harden.

The best Way of gathering this Crop is by pulling up the Plants by Hand, for they root very slightly; after which they are to be housed; that they may dry without waste, and the Seed is then to be thrashed off for Sale.

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## C H A P. XCV.

### *Of Caraway Seed.*

THIS Seed is as well known as Anise, and it grows upon a Plant somewhat resembling it in its general Form. It may be cultivated in ENGLAND in the same Manner as Anise, but with less Charge and Hazard, for it is hardier; and it yields the greater Advantage, as it does not perish when the first Quantity of Seed is ripened, but lives several Years, producing successive large Crops.

The Method of raising it is much the same with that we have described for Anise, but easier; and we have therefore given the other first, that the Farmer who shall not chuse to attempt that, may be acquainted with every thing necessary to be known about this, which he will less fear.

The Caraway Plant grows four Foot high; the Root is long and white, and is of a pleasant Taste. The Leaves which rise from the Root, are large and very finely divided. The Stalk grows up in the Midst of these, and is hollow, striated on the Surface, and divided into a great many Branches. On these stand Leaves like those that rise from the Root, only smaller, all divided into very narrow and fine Parts: at the Tops of the Branches grow Tufts or Umbells of white Flowers; after which come the Seeds, growing two together. The whole Tuft has no Leaves about its Bottom, nor have the single Flowers any Cup, except so small a one as is scarce observable: in these Particulars, as well as in its general Growth, it agrees with Anise. Each Flower is composed of five little Leaves, which turn back at the Extremities. In the Center of each rise five slender Filaments, each having a little Button or Head, and among these grow up two fine Threads, which are the double Style of the Flower; after the Flower is fallen the Seeds grow two close together, and separate when they ripen. There are two or three other Kinds of the Caraway Plant, named by Writers on Botany, but only the common Sort, which we have here described, is worth the Husbandman's Notice.

The proper Soil for raising it is a deep, rich, mellow Earth, the more like Garden Ground



the better. If there be some Sand among it, provided that be not in too large a Quantity, it is not the worse, wherefore a rich Loam will do; but in general, the richer the Soil the greater will be the Produce.

To prepare this Land for Caraway it should be plowed up in Autumn, and again in the Beginning of FEBRUARY: a Week after this it is to be harrowed carefully, and laid even, and then it is ready for sowing.

Caraway Seed is plentiful enough, and cheap enough, but let the Farmer see he buys such as is sound and good.

The Quantity that is necessary is seven Pound to an Acre. When this is sown as evenly as can be, it is to be harrowed in, and then left to shoot.

When the Plants are about three Inches high, the Hoers are to be sent into the Ground, but they must, both in this and Anise, be well instructed first in the Appearance of the Plants themselves, which otherwise they will be very apt to cut up among the Weeds.

They must hoe up the young Growth of Weeds that will be now found among the Caraway, and thin the Plants themselves where they are too thick, taking up the poorest, and leaving the others at about eight Inches Distance every Way.

If this hoeing be carefully done, it will be of prodigious Use to the Crop. The Plants will thrive after it in a very surprising Manner, and they may be, for the future Part of the Summer, left to themselves, for they will get so much Strength before a new Crop of Weeds rise, that they will have no Chance among them.

The Crop is not to be expected the first Summer. Some of the Plants will run up to Seed, and if so many do as are worth cutting, it may be done, but often 'tis otherwise; so that the Farmer must not lay his Account to have a Crop the first Year.

The Field is to lie the whole Winter untouched: in Spring it is to be hoed again, and the same in August, and soon after this last hoeing the Seed will ripen. There will be a very large Crop, and the same for three or four succeeding Years, which is to be cut up, dried, and thrashed for Sale.

Having thus treated of the several Particulars under this Denomination, we shall give a few general Chapters on the great Article of sowing, and with that close the Account of Tillage and its Objects.

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C H A P. XCVI.

Of Sowing.

IN the Article of Sowing two Things are to be considered, the Nature of Seed, and the Temper and Quality of the Ground. Some Kinds of Seed will bear Wet, others will be injured by it; and some Land is fittest for Sowing when wet, other Kinds when dry.

It is a Rule among the Gardeners to sow dry and set wet, but this will not hold altogether with

the Husbandman. His Fields are a larger Garden, and he must not be confined to such little or narrow Rules.

As to the Temper of the Ground proper for Sowing, that depends upon its natural Condition, all Lands should have some Moisture when sown, but the driest should have most.

A Land naturally moist may be sown in any Weather, but dry Soils may be sown in Weather that is very wet, provided the Seed be one that will bear wet.

Wheat ought to be sowed when the Earth is moist. This is an Exception to the Gardener's Rule, and it is the most important Article in the whole Profession. It can hardly be too wet for the Sowing of Wheat, for this Seed not only will bear wet but requires it: on the contrary, Rye, as we have shewn, cannot bear it, nor requires its Assistance. Rye cannot be sown too dry: it always thrives so much the better.

Rye that is sown upon the driest Land, and in the driest Season, will come up without any Rain; but Wheat will lie as if it were dead in the same Weather.

The Farmers observe the Season of the Year for Sowing, and when that is come they get in their Wheat be the Weather what it will, for this Reason it sometimes will lie six Weeks in the Ground without any visible Shoot, but the first good Rains bring it up, if they come in Time: if not there is but a poor Appearance, for often half, or the greatest Part, will spoil with so long lying in the Earth.

Let the Farmer in this, as in all other Things, follow Reason and Experience, rather than a blind Custom. Let him use the common Season for Sowing his Wheat, if the common Weather happen in it; if not let him stay beyond that Time. Those who fixed the Time of Sowing Wheat, did it because Rains usually fall at that Season; if any Year it so happens that they do not, let him wait till they have fallen. He will thus better observe the Sense of the antient Rule, than those who stick to the Day.

Wheat is not the only Kind that requires Moisture: but most succeed very well; nay many of them best without it.

Black Oats require as much Moisture as Wheat, therefore let the Farmer never sow them but in such a Season: on the other hand, Barley does very well in a dry Time, and all the Summer Corn in general.

Nature takes Care of the Seeds of wild Herbs. They fall at any Time when they are ripe, and be the Season what it will they grow. Some are lost but enough remain. This is plain, because no Kind of Plant whatsoever has been lost since the Creation. We read in very old Authors of the Herbs of old Time, they do not mention a great Number, but all they have described distinctly, are found to this Day.

The later Writers have been more curious in setting down the Names and Figures of a vast Variety of others, and in the same Manner all they have named continue in their Places; or if they are lost in one, they are found in another.

These are sown as Accident directs, and they succeed; here is no Regard to wet or dry, yet they prosper. This is true; but let it not mis-

lead

lead the Farmer. Far from too much, there is too little Care taken in the Sowing of Corn, let him be doubly assiduous not remiss; these Plants which Nature sows at random, are only to keep up the Species.

The Wheat sown by the Husbandman is to be consumed in Food in the far greater Part: and after it has fed Millions, enough is to remain for keeping up the Species. This is a great Difference, and requires all his additional Care.

It may be said in the same Manner, that the Earth does for these Seeds of Herbs that are wild, without Tillage, or any careful Manner of placing them in the Ground; they fall as Chance directs, and yet they grow. The Answer is the same, that a small Supply only is wanted from them, therefore this casual Way of Sowing is enough; if much of the Grain were required for other Uses, then Care and Culture would be needful.

The Creator of all Things saw at first the Condition of Wheat, and the other Grains He intended for the Support of Man's Life, and He knew they would therefore have his Care and Labour for their Production. The others which were of no such immediate Use or Value He foresaw would be taken little Care of, He therefore provided for their succeeding of themselves. Provision is made accordingly, and it is wonderful in what various and elegant Manner.

They are in general inclosed in a Case, serving as a Womb, in which they are retained till in perfect Maturity, and which then opening discharges them to the Ground. They therefore do not fall till ripe, and fit for growing; and they are suited to preserve themselves in a proper State, and keep in a proper Place, in a surprising Manner. Those intended to root about the Mother Plant are small and heavy, so that falling they take Root at once, this we see in Henbane, and many others. Those which are intended for spreading are winged with Down, as those of the Thistles. Such as by their Lightness would be carried away by every Puff of Wind, have Hooks and Prickles to detain them, as Seeds of Clivers, Avens, and Burdock. Agrimony Seed also is rough, so that it lays hold of any thing. Many of these are intended for the Banks of Fields, where they could not lie but for these Hooks and Prickles, that serve to keep them in their Places. The Seeds of some, which are to be scattered at a Distance, are lodged in Cases or Fruits, that toss them out by their spring in breaking, such as Wood Sorrel and the wild Cucumber; and some, that they may not rise in Clusters together, have a Kind of Wings by which they are influenced by the Wind, to move about upon the Ground; the Fruits of some Trees are of this Kind: the Ash Key and the Pine Kernel are an Instance. As this provides against those Trees rising close to one another, in which Case they could not thrive, so the other is generally given where there is a creeping Root. Wood Sorrel runs a great Way in the Ground by the Root, and therefore this scattering of the Seeds to a Distance is more useful.

Though these, and the Generality of wild Herbs, take their Chance as to the Weather, and

yet succeed enough to preserve their Species, yet there are some that require to be sown only in peculiar Seasons. Thus blue Gentian will not succeed unless sown when there is wet, but Nature has provided accordingly, for the Seeds are lodged in a Case that hold them firm in dry Weather, but splits at the first Drop of Rain that falls upon it.

Thus we see Nature provides for Weeds by various Means, though they be little regarded. Corn is left to the Care of Man, because of its Value, let him not therefore neglect it. It requires a particular Caution and Attention, as well as Labour, to raise it, but the Trouble and Expence are well returned. He who understands best how to employ his Labour will have the best Crop.

Nothing is more slightly or inconsiderately done than the Sowing in the common Way. We see that a certain Time of the Year is fixed upon for doing it, without regard to the Weather, which ought to be the chief Point in View on that Head; and in the usual Way of doing it the Seed is scattered at Random, from the Hand of an unskilful Person, and covered very unequally. It falls too thick in some Places, and too thin in others: and in some it is buried so deep it cannot rise, while in other Places it is burnt up by lying naked on the Surface.

Instead of employing that judicious Care so needful in the sowing Corn, Man here scatters it more at Random than the Seeds of the worst Weeds fall by Nature.

Every Seed has its proper Weather for Sowing its proper Thickness upon the Ground, and its proper Depth at which to be covered: these are the three great Articles in Sowing. We have shewn the Regard that is to be had to the Weather, for the different Kinds; and the Rules by which their Depth and Distance may be found. ENGLAND had great Obligation to that Earl of CASTLEMAIN who brought over the original Drill Plow, or Sembrador, from SPAIN; and the World has great Obligations to LEUCATELLO, who invented it; but their Services would have been of little Use if not of late revived by Mr. TULL. They had slept many Years, and would have been altogether lost and forgotten. His Praise therefore is no less than that of the Inventor or Importer of the Machine.

C H A P. XCVII.

Of the Nature of Wheat Seed, and the particular Manner of sowing it.

THE Reason why Wheat requires a particular Care, and a particular Season for the sowing is, that it is a tender Grain. Rye is hardy, and therefore will succeed, as we have shewn, under the same Condition wherein Wheat will come to little.

Of all our Grain Wheat is least able to bear the Severity of Cold; and yet from its Time of Growth 'tis necessary to sow it before Winter. It has therefore all that hard Season to get thro', and this is the Difficulty.

As it must live through the Winter, the Farmer

mer is to defend it as well as he can against the Cold, which it is so ill able to bear; and the best Way he can do this is, by taking Care that the Earth lie hard about it during that Season. this, is in a great Measure provided by sowing it in wet Weather, the Soil then closing and caking about it; but this brings on another Difficulty. Wheat, of all Corn, requires the most Nourishment; and we know it cannot search for it by the Roots, unless those Roots can spread; nor can they do this except the Ground be properly loose and free. Therefore, as the Condition of Wheat requires the Ground to be compact about it in Winter, so it requires it also to be loose in Spring. This is very difficultly to be managed in the common Way of Husbandry, but it does very well in the drilling and horseshoeing. The Depth at which it is let in by the Drill, gives the Earth Opportunity to close about its Roots, and defend it from the Frosts; and the breaking the Ground between the Rows, by hoeing in Spring, divides the Soil, and makes Way for them to pass in Search of Nourishment.

Therefore the Drill and Horseshoeing Husbandry is most of all suited to Wheat, which is the most valuable and profitable Grain; 'tis fit the Husbandman perfectly understand the Nature of this capital Grain, if not he will forfeit half the Profit of his Harvest by the Sowing. There are general Rules for Sowing which hold true in most Cases, but Wheat is an Exception to others of them, beside that we have named.

'Tis a Rule to sow on the Ground as soon as 'tis plowed, that the Seed may have the Advantage of the fresh Tillage. This to most Kinds is very great; but with Wheat another Method is to be followed.

Let the Land be plowed when it is dry, and let it lie till there come Rains to wet it. 'Tis proper to wait for this Advantage, though the Earth lie three Weeks before Sowing, after the Plowing.

If the Land be a sandy Loam, the clayey Part of which is binding, 'tis best to sow it dry, as well as plow it in that Condition. In this Case let the Sowing come directly after the Plowing.

These are the general Rules, but let them be understood with Discretion: though the Ground should be plowed dry for Wheat, it should not be so dry that the Dust should fly; and though it should be drilled wet, it should not be like Hasty-Pudding. Moderately dry and moderately wet is what we mean by the Direction, but it will bear an Excess better in the former than the latter.

The Difference between Ground broken wet and dry, may be seen in Banking. A Bank made of wet Earth will keep firm many Years, when one of the same Ground dry will moulder continually.

Let the Seed Time be deferred till the Ground is sufficiently wet, and the dry plowed Land will never fail to produce larger Crops than the wet.

The Consequence of Plowing wet is almost equal to that of Banking; a Piece of Land plowed wet in NOVEMBER, will be harder in Spring

than one plowed dry in August. All Ground grows hard by lying, and naturally the longer the harder; but this Effect of wet out-does that of the Time, though there be a Third of the whole Difference.

When the Land that has been plowed dry is wet enough for Sowing, let it be once harrowed lightly, just to level it, and then let it be sown.

Wheat may be drilled any Time between Harvest and NOVEMBER, but in general 'tis better to drill earlier than those who sow in the common Way, than later.

When Wheat is sown early less Seed is required, when later more. Poor Land should have more Seed than rich, because more of the Plants will be destroyed on the poorer Land in Winter. Beside the Plants thriving better on rich Land, will have each more Stalks, so that one of them will be equal to many on poor Ground.



C H A P. XCVIII.

Of the Proportion of Seed Wheat to the Land.

THE Quantity of Seed Corn sowed in the new Method of Husbandry is a very considerable Article in its Recommendation; the proper Quantity for an Acre of middling Land is from four to six Gallons, this will surprize such as are not used to this Husbandry, but the very smallest Proportion here named is often sufficient.

If the Land be rich, and be ready for drilling early, four Gallons of middling Seed will be enough. The Danger of drilling it too thick is, that it will fall; and when too thin the Quantity is often diminished yet farther, by its blighting in Spring. When it is planted early less serves, because it is more safe; that which is drilled late being found, by all Experience, more liable to Accidents from Worms and many other Causes.

Where there is Danger of Worms the proper Caution is to plant it shallow. Wheat will come up if covered three Inches deep, and it will stand very well if not deeper than an Inch; therefore let the Farmer proportion the Depth to the particular Circumstances and Season of his Sowing. The Way Worms destroy Wheat is by eating off the Thread that is continued from the Grain to the Blade. Worms lie deeper in Winter than at other Seasons, by Way of defending themselves from Cold, therefore when the Corn is drilled shallow they never come near that Thread.

As the Quantity in the Drill Method is much less than in the common Way of Sowing, the more Care must be taken that it be preserved. We have shewn how it will best escape Worms; but the Rooks are great Destroyers, they must be kept off the Land about the Time of its first shooting. This is the only Period when they are dangerous, but they are very destructive then. Boys must be employed to fright them away. The Farmer must not stay till he sees the Blade up, before he sets on his Guard. It is true the Rooks

Rooks will not meddle with it till it has shot, but they will see this before the Owner. They are sharp eyed, and just when it peeps above Ground is the Time they devour it. They tear it up for the Sake of the Seed, which is then plump and full: when the Shoot has been up a few Days the Flower of the Seed is exhausted, and they will not meddle with it.

That Wheat is safest from Rooks which is planted nearest the Harvest Time, there is then a great deal of Corn scattered on the Ground, and they feed well. While they have Plenty of this they will never look for the other, but when hungry they are very bold and very cunning.



C H A P. XCIX.

Of sowing Turnip Seed.

WE have observed that about MICHAELMAS is the best Time for sowing Wheat. Much sooner it cannot be sown; and it is not prudent to do it a great deal later. In Turnips we are not to be particular to a Time. They may be very well sown from MAY to AUGUST; and in this the Farmer is to guide himself by the Nature of his Land.

In a moderate Piece of Ground, MIDSUMMER, or a Week before, or a Week after, is the best Time; in poorer Land they should be sown six Weeks sooner, and such as is in very fine Condition for them it may be let alone till six Weeks later. Experience shew that Turnips, on a very good Field, will be as forward if sown at this late Time, as on a poor one at the earliest.

As to the Quantity of Seed, we have observed on another Occasion, what a vast Difference the Drilling makes from the common Method; four Pounds is often allowed to an Acre in the common Way, and in the Drilling Method four Ounces is full enough.

In the Drill Method Wheat may be sown upon the same Piece with Turnips; and this is to be managed thus. The Turnips must be sown early, they will then be well grown by MICHAELMAS; and that is the Time for sowing the Wheat. The Turnips being in distant Rows Wheat may be sown between them, the Earth being properly broke for that Purpose. Almost all the Earth may then be taken from the Turnips; and thus they may stand with the Wheat during the Winter. In Spring they are to be pulled up, and the Wheat is then to be left to take all the Advantage of the Ground till Harvest.



C H A P. C.

Of sowing Beans.

THE Season for sowing Beans is FEBRUARY, and the most proper Earth is such as is strong, and will retain some Wet. The Spring Rains follow this Sowing, and the Crop seldom fails unless for want of a due Moisture, so that it must be an unnatural Season alone that can prevent their thriving if thus sown. Pro-

vided they have this Advantage they get a good first Shoot, and no Weather that comes afterwards can hurt them; the richer the Land the better for Beans, provided it have this Firmness to hold the Wet. The richest Soil will not answer without this Quality, for if they shoot well at first they will be lost if there come a dry Summer. A loamy Field, with some good Mixture of fine Earth, is the proper Place for this Crop, few know the Value of Horse Beans for want of understanding the proper Soil, Seed Time, and Manner of sowing them; we shall endeavour to instruct our practical Husbandman on each Head, from the Result of Experience.

We have mentioned the Improvement of clayey Soils by Sand, in the Beginning of this Work, a Soil so altered and amended becomes a Loam of the best Kind; these Clays seldom fail to have rich Earth among them, and though in their original and natural States they locked it up, and it was of no Advantage, yet when thus divided by the Sand, broken by Tillage, and calcined by the Sun and Air, from frequent turnings, they become a very rich and very strong Land, and they are able to retain a great deal of Moisture: these therefore are the very best Soils for Beans. The next to these are such as by Nature come nearest them; that is, such as are loamy, with a good Mixture of Mould among them.

Let a Field like this be chosen for Beans, let them be sown the third Week in FEBRUARY, and if they have the Advantage of a dripping Spring, the Crop shall be equal in Value to one of Barley.

We have shewn what is the great Advantage of Horsehoeing to Wheat, in the causing a great Number of Stalks to rise from one Root, and each to have a great deal of Corn. The same Effect is produced by this Practice in Respect of Beans. I have counted ninety-five Pods upon one Stalk, all well fed and full of Seed well nourished; and a common Number is sixty or seventy on a Stalk when thus managed. In this Case the Land cannot easily be turned to a better Account. As loamy Soils are the best for Crops of Beans, sandy are the worst, yet there are wet Sands that have some Clay in their Composition, though not enough to get them the Name of Loams, that succeed very well with this Growth; in these Cases the Seed should be always drilled in Rows at four Foot Distance, and a Farmer who manages properly may get a good Crop of Turnips between.

When any one has a Desire to raise Beans upon a Land that is not naturally suited to them, he must encrease the Quantity of Seed, and be particularly careful in the sowing. Many of the Plants will come to little; and if added to this Part of the Seed be lost by Carelessness in getting it into the Ground, and the rest bear but a poor Quantity, there must be a miserable Prospect. Dry Weather always hurts Beans, and when they stand thin it destroys them.

When too few Plants rise the Weeds will come up too abundantly, and when those that come up are not strong, they get Strength and overpower them. On good Land three Bushels will sow an Acre, but it is better, when it is any thing

thing less than the best, to sow four, and on Soils that are poor or dry five Bushels.

There are two Ways of sowing them in the ordinary Husbandry, by the broad Cast and plowing them in; for this the Seedsman follows the narrow Wheel Plow, and throws in the Seed from his Hand in a direct Line, all the Way along the Furrow: this is called spraining them in. The Furrow is left open in this Way by the Plow, but the next turn covers it, and the Beans are buried to a good Depth.

Another Way of sowing, or rather planting Horse Beans is by Hand, and it is practised in several Parts of ENGLAND, at a very moderate Expence, Women do it, and the Method is this.

The Land is plowed light, and the Women draw Lines in it at a Foot and half Distance. They have an Instrument they call a Dibble or Dibber in their Hands, and Beans in their Apron, and they work by the Line; the Dibber is an old Spade Handle cut off to five Inches length, and tipped at the Point with Iron. They have this in their right Hand, and they take out the Beans from their Apron with their Left. They strike the Dibber into the Ground, and drop a Horse Bean into the Hole. They thus plant the Beans at about three Inches Distance, in Rows eighteen Inches asunder. This is a very proper Position, and a very regular Method of planting them, and 'tis done with so much Ease that the Expence is very moderate.

When the whole Field is planted they go over it with a Harrow, which sufficiently covers the Beans; and then they give them two Handhoeings before Harvest. This is very nearly of kin to the Drill and Horsehoeing Husbandry, but it is not equal to it in Advantage, as we have shewn; for this Handhoeing only scratches the Surface of the Ground, whereas the other tears and breaks it to such a Depth, as to invite the Roots of the Crop where the Nourishment is most abundant.

In WILTSHIRE they plow only lengthwise, never across, and sow their Beans by the broad Cast twice in a Place, they then harrow them in, and so leave them to their Chance.

In other Places they don't harrow till about the Time when the Beans are just going to shoot, then they go over the Ground carefully with the common Harrow. This tears up the young Growth of Weeds, and breaks and divides the Ground at the Surface, covering up the Heads of the Beans; immediately after the Harrow they draw over a moderate Roller, which fixes the Earth at the Surface, and levels all for the Scythe at Harvest.

The Drill Method of sowing is best of all, and the Distance between the Rows not only gives Opportunity for Horsehoeing, which vastly strengthens the Growth, but the Plants having a free Passage for the Air to their Bottoms, blossom and bear Fruit all the Way down. This

vastly encreases the Quantity, and at the same Time ripens them better.

Though the Horse Bean is what the Farmer means whenever he talks of his Bean Crop: yet this is not the only Kind that is cultivated in Fields, they sow five other Sorts in the same Manner about LONDON, and in other Places where there is a large Demand, for the supplying of the Markets; these are the Windsor and Sandwich, the Broadstock, the Lisbon and the Hotspur, this last is a small Bean, but is valued for its early Time and good Flavour.

There is also another Kind that is very properly brought into Use of late, and ought to be introduced universally; and this is properly the Country Farmer's Concern: this is the Tick Bean, it is properly and truly a Horse Bean, but it is much broader than the common Kind, and answers better on every Occasion. This is best planted by Hand with the Dibber, and the Rows ought to be at least two Foot asunder, it yields vast Crops.

The common Method of managing these is by the Hand Hoe, and it does a great deal of Service, though nothing equal to what would be by the Horsehoeing. They give them two Hoeings in this Manner; when they first shoot up they come in with the Hoe, and cut up all the Weeds between the Rows, and at the same Time earth up the Beans: then, when they are about six Inches high they come in and hoe them up again, this second Earthing is of great Benefit to the Beans, and the Weeds being destroyed at this Growth, are rarely troublesome again.

Some have supposed, from hearing the Husbandmen of other Counties talk of small Ticks and large Ticks, that there were two Kind of Beans of this Denomination, but this is not the Case. There is but one Kind of Bean properly thus called. It is a Horse Bean of the Size of the Hotspur Bean, and is hardy and very fruitful. What some call the small Tick is only the common Horse Bean.

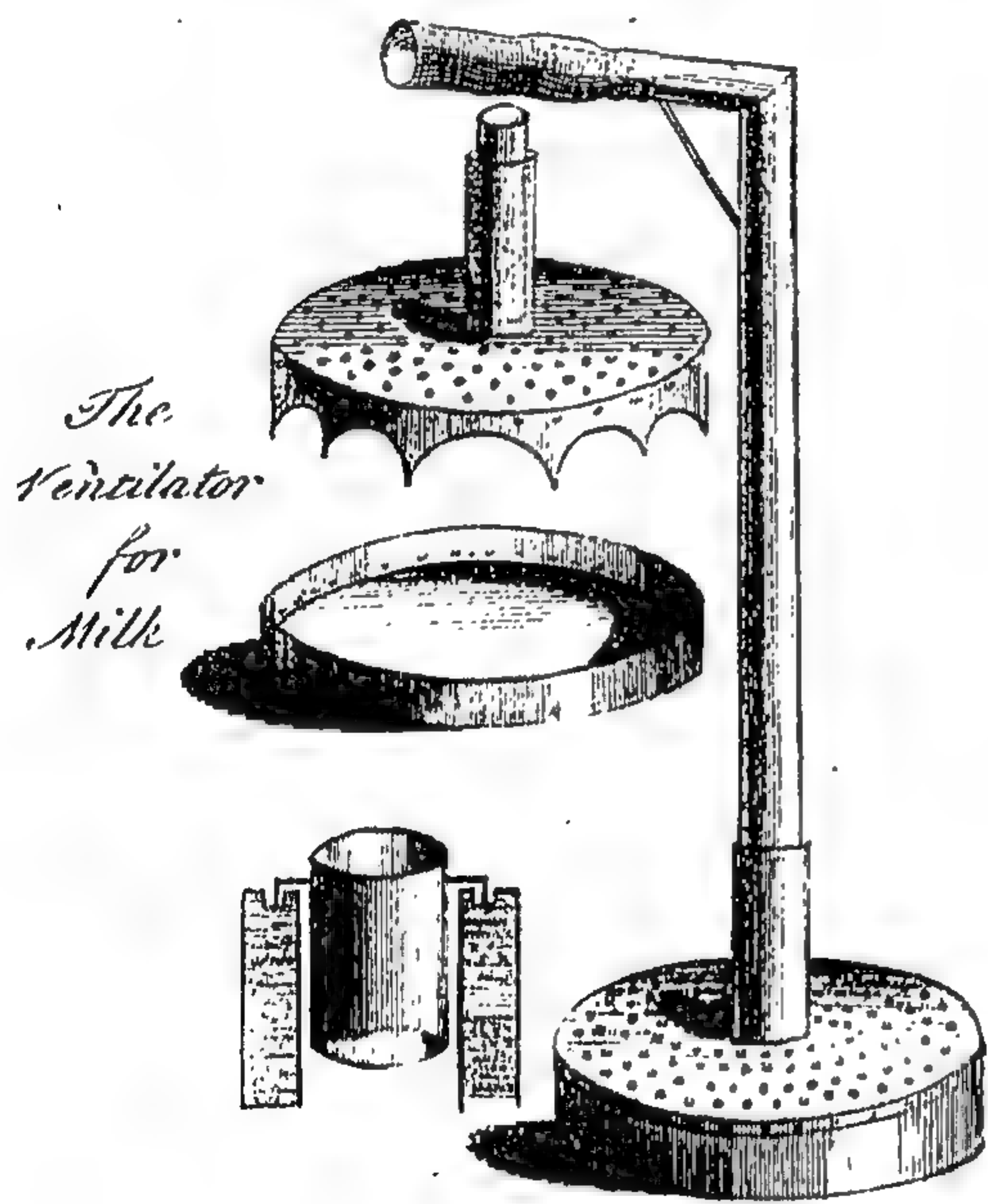
The Tick Bean is more hearty and nourishing than the common Horse Bean, but as it is larger it requires longer drying. When this is done imperfectly in the Field, the Way is to finish it on a large Floor in an airy Place, or in a Kiln. The safest Method of keeping them is to split them and dry them afterwards; in this Case they are never liable to any Accident. They mix excellently with Oats, Chaff or Bran, and are of the greatest Service to the Cattle.

There have been Times when Bean Bread was eaten for want of better Flour, and no Harm ever happened from it: on the contrary, it was found to be more strengthening than any other.

From what we have here laid down from repeated Experience, let the Farmer learn the Value of a Crop of Beans; but at the same Time let him weigh with himself the Profit he will have from other Crops, and the Condition of his Land. Let him beware that he is not led away by the Benefit of any one Kind, but chuse the best.



*An Elevation of a Farm House, with the Orchard Planted at Distances,
and the Ground Cultivated between.*

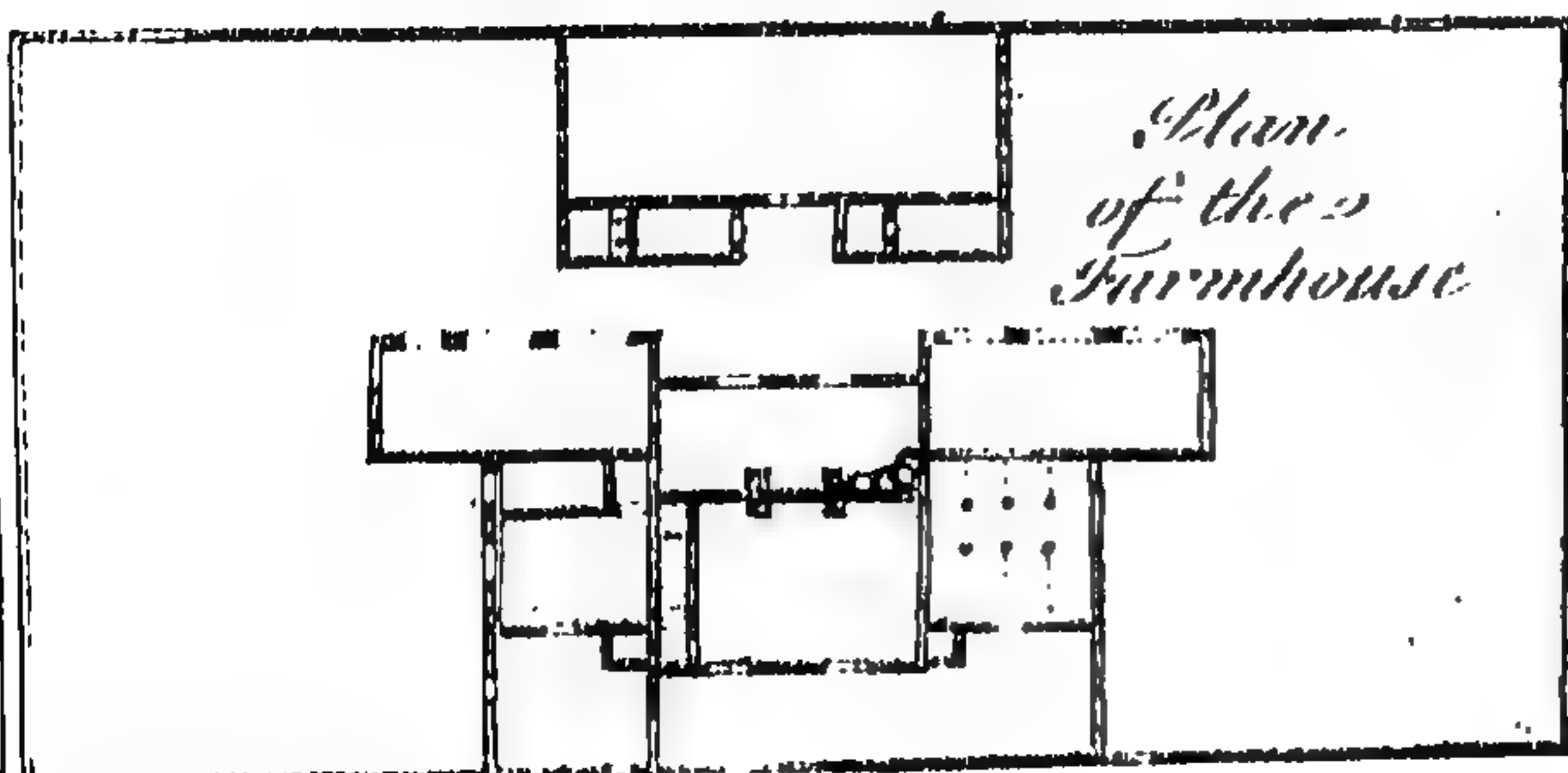


*The
Ventilator
for
Milk*

The

Orchard

Plantation



*Plan
of the
Farmhouse*



A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK X.

Of the natural and artificial Products of the Farmer's Stock.

CHAP.

1. Of Milk, and its natural Production.
2. Of the Nature of Milk.
3. Of the several Kinds of Milk.
4. Of Cows Milk, and its general Differences.
5. Of chusing a Milch Cow.
6. Of the Quantity of Milk yielded by each Cow.
7. Of the Times of milking.
8. Of the Manner of milking.
9. Of ordering the Milk in the Dairy.
10. Of the Vessels of the Dairy.
11. Of setting the Milk for Cream.
12. Of skimming the Cream.
13. Of the Management of the Cream.
14. Of Butter.
15. Of Churning.
16. Particular Rules relating to Churning.
17. Of the washing and making up of Butter.
18. Of making Butter from new Milk.

CHAP.

19. Of salting of Butter.
20. Of Whey Butter.
21. Of the Use of the Barrel Churn.
22. Of Cheese.
23. Of the Rennet or Cheese Bag.
24. Of new Milk Cheese.
25. Of a one Meal Cheese.
26. Of skim Milk Cheese.
27. Of Cheshire Cheese.
28. The Way in which Cheshire Cheese is made.
29. Of making Cheese like Cheshire in other Places.
30. Of making Sheeps Milk Cheese.
31. To make a Nettle Cheese.
32. To make a running Cheese.
33. Somersetshire Cheese.
34. Of several other Kinds of Cheeses.
35. Of Wool.
36. Of Leather.

The INTRODUCTION.



WE have considered in a preceding Part of our Work, that important Article of stocking the Farm, and have acquainted our Husbandman with the several Breeds of those Animals which he is to feed upon its Produce for Labour or Profit.

We have supposed him provided, and have since gone through those several Articles by which he is to procure them Food, and in which he is to use their Service: this done, we come in the present Book, to treat of those

Benefits he receives from them in their several Products, and the best Manner wherein he is able to use them to his Advantage.

We divide them into natural and artificial, as they are of two Kinds, properly coming under those two Denominations; one part of them arising naturally, and being used in the Condition in which he receives them; the other requiring Art and Management to bring them into the State that is fit for Sale.

Of the first Kind, or natural Products of the Stock, are Milk and Wool; these he receives from the Udder, or sheers from the Back; and he

he may sell them as they are, that is, in their natural State and Condition; of the artificial Kinds are several Things arising from the Use or Manufacturing of the former. Thus Butter and Cheese, though originally owing to Milk, yet are not obtained without manual Labour and Art. These we call the artificial Products of the Stock; and under the one or other of these Names, we comprehend the whole Produce from these Animals, according to the Manner in which it is obtained from them.

We shall treat of these several Subjects largely, though in as few Words as the Nature of what we have to say will permit. Many useful Things there are which the Farmer yet does not know relating to these Articles; nor shall we omit Matters of Curiosity relating to them, when they tend to explain and illustrate such as are of Use.

We apprehend that the Farmer of one Place may be instructed by seeing here the Practice of the Husbandman in another. There are many Things also written on these Matters, from which separating the useful from the ostentatious Part, much Knowledge may be drawn.

We propose therefore to lay before our Readers, so far as we have been able to collect or learn, the Substance of some have written, and others have practised; and upon the whole to build a System for the Conduct and Management of these important Articles; which the Farmer's Reason shall countenance, and, we doubt not, his Experience afterwards approve.



CHAP. I.

Of Milk, and its natural Production.

IN treating of Milk, the first Thing needful is to consider what it properly and truly is, for on that will be rationally founded all that is added concerning its Use.

Milk is a Fluid separated from the nutritious Juice of Bodies, called their Chyle; deposited by Nature in the Breasts or Udders of Female Animals, during their Pregnancy, and for the Nourishment of their Young.

After the Young is born it comes in greater Abundance: and it will be prepared and furnished by Nature in that plentiful Manner, so long as it is sucked by the Young, or any other Way drawn at Times; but when no Use is made of it, the Supply ceases; and the Milk, as the Expression is, dries up of itself.

We have mentioned the Breasts and Udders of pregnant Females as the natural Place for Milk; but the Curious have discovered, and sometimes Accidents have shewn, that it is not limited to that Sex, or that State; Male Creatures, both Human and of the Brute Kind, have had Milk; and among the Females, such as have not been in a State of Pregnancy.

The Roman Charity so famous in History and Paintings, is an Instance of the latter in the Human Species; wherein an old Man confined in a Dungeon, was supported with Nourishment by sucking the Breasts of his Daughter a Virgin.

As to the former Case, Accidents have from time to time rendered it notorious; so long since as the Time of ARISTOTLE, it was known that some Men had been found to have Milk in their Breasts: and CARDAN upon his own Knowledge relates the same, averring that there was such a Quantity, that a Child might be nourished by it. PLINY relates the same of a Man in his Time, and ALDROVAND of another. These Authorities so numerous are not to be doubted; nor is the Thing confined to the human Species in this Instance: we have a circumstantial Account in the Philosophical Transactions, of a Weather Sheep giving suck to a Lamb; and that not wantonly or for once, but in a regular Quantity, and enough for the Support of the young Creature many Months.

Wonderful as all these Accounts may appear to those not used to consider Things in their Causes, there is not in Reality any Thing so strange in them, when the Matter is fully weighed.

Nature has provided Breasts and Udders, with their Teats and Nipples, for all Females, younger as well as grown up; and to the Males she has given the same Parts, by way of Conformity in the Species, though not intended for the same Service.

Milk is a natural Juice, and although prepared regularly at a certain Period, yet being formed from the Nourishment of the Body, it may be produced at any other; and as the Nourishment of Men is the same with that of Women, there is no Reason why it should not, if wanted, be supplied by one as well as the other.

We see in the common Course of Nature, that sucking will make it continue to flow when it otherwise would have dried up; and there is not much more wonder that the same Force should bring it to a Place naturally destined for it, even at a Time when it would not otherwise have come.

This Method of reasoning, plain and familiar as it is, will very well explain the Breasts of Virgins affording Milk on being sucked; and we shall not, upon a like rational Enquiry, find it any Thing more strange, that the same Force should bring it into the Breasts of the other Sex, whether in Human or Brute Creatures.

We see in Men the Texture of the Breasts is not very unlike that of Womens, and the Nipples are of the same Structure entirely. We have no Reason to suppose the Resemblance stops here. Indeed Anatomy shews that it does not, and therefore as the Parts are of the same Structure, and there is the same Nourishment for the Purpose, it is not strange that sucking should produce it.

The most plain Reader may understand these Reasonings; and so it is throughout all Nature: hard Words are only Cloaks for Ignorance. We believe it will from this appear, that far from discrediting the Stories, they have heard or read of Milk in Virgins, and Milk in Male Creatures, our impartial Readers will join with us in Opinion, that the Wonder is rather that such Things are not more common.

It is not straining the Point too far to say, that

that probably any Virgin grown near Maturity, or any Man in Health, would give Milk if suck'd some time for it; and the same is doubtless equally true of Animals of other Kinds.

This seems to be a Provision of Nature, careful of all her Productions, as a last Resource in case of extream Necessity for the tender and defenceless Young of Animals, which from Accidents would otherwise be lost.

C H A P. II.
Of the Nature of Milk.

MILK is very much of the Nature of what is called Chyle, that is, the nutritious Juice separated from our Food, and intended for the Support and Nourishment of our Bodies. All our Foods tend to the Formation of Chyle, and the great Purpose of Nature in their Digestion is the furnishing of a sufficient Supply of it; for on this Restoration and Preservation of the Fabrick depend.

Chyle is a thin white Juice, consisting of the finest and most nourishing Part of our Food; and Milk is properly speaking, nothing more than a thicker and richer Chyle: when the two are compared together, there is found no other Difference between them; therefore we may very reasonably conclude, that Milk not only is made of Chyle, but that it is made by a very natural and easy Procedure; for there seems nothing more to have been done than this, that a Quantity of Chyle has been brought into the Glands of the Breasts; and there some of its watery Parts have been separated from it; and the Remainder becoming richer by that Means, has been left there ready to be drawn by the Mouth of the Young, or otherwise, in the Form of what we call Milk.

It is not strange that Milk should be thus made by depriving a nourishing Juice of some of its watery Parts; for upon Examination by Glasses, we find that it still consists of only a small Part of real and rich Nourishment, mixed with a larger Quantity of a watery Fluid; and what we thus discover by Glasses, the Progress of Nature when Milk is left to itself to spoil, or when it is managed usefully in the Dairy also confirms; for whether Milk become unmixed, as we may say by the Course of Nature, or by Management for useful Purposes, still the same Thing is found; namely, a smaller Quantity of rich Matter, and a much larger of a watery Fluid.

When Milk is viewed with powerful Glasses, it does not look an uniform white Liquor, as it appears to the naked Eye, but is discovered to consist of two different Matters; the one white and rich which is kept separate in round Drops, and the other thin and watery: this last is the more large Quantity, and the other Drops swim in it.

In the same Manner when we make Butter and Cheese, we force a Separation of those Parts, which we could not see to be distinct and different in the Milk, though this common Operation shews they were so: the rich Part makes

the Butter and Cheese, and the other runs off poor and watery in the Butter Milk and the Whey.

This is a Proof of the Truth of what Mr. LEWENHOECK first declared he saw by Glasses, and it is thus that the common Operations of our Lives illustrate the Truths of Philosophy; while Philosophy shews us the Principles on which they are founded, and will therefore be useful to improve them.

The old Physicians thought the Milk in the Breasts and Udders of Animals was formed from the Blood, but that led them into great Difficulties: Nature does not go to work by such round-about Ways; the Process by which Milk was formed, might then well appear difficult to be comprehended; but upon the present Plan it is very easy. Milk is first of all conveyed to the Breasts in form of Chyle; that is, very nearly in its own proper Form; and as to the Change it undergoes in being separated from some of its watery Mixture, 'tis no more laborious, intricate, or difficult, than that of the Separation of Urine through the Kidneys; nothing more is done than the throwing off a watery Part.

C H A P. III.
Of the several Kinds of Milk.

THE Reader has seen that Milk is only a richer Kind of Chyle: he has been informed how it is prepared, and in general of its Nature: to come a little closer to that Point, we are to examine it farther.

We have seen that it is composed of more rich and solid, and more fluid and watery Parts; but although the Assistance of Glasses could inform us no farther concerning this Matter, the Operations of the Dairy do.

Philosophy shews us, from its Assisstant Microscopes, only two Parts in Milk, but Experience discovers three.

Milk is found by the Operations of the Dairy, to consist of these three Parts; the Buttery, the Cheesy, and the Wheyey.

The Buttery Parts are those which being of an oily Texture, separate most easily, and get to the Top. This is found agreeable to all we know in Nature: we find Butter to be of the Nature of Oil, and we know Oil will swim upon Water. Therefore we find that these three separate Parts of which Milk is composed, are of three different Qualities; and by first understanding them, we shall easily comprehend all the Operations by which it is suited to our various Uses.

These three Parts are, 1. The oily; 2. The curdy; and, 3. The watery. The oily are, as we have seen, the Buttery Parts; the curdy are the Cheesy, and the watery are the Wheyey.

Nothing but the Force of Nature in the Body of the Animal, could work and blend these perfectly into one rich and nourishing Fluid, fit for the tender Stomach of the Young. We find they are so mixed there; and that they continue mixed in that Manner for some Time, after

as much and as good Milk from black Cows, as ever was produced from red; and we may call all SMITHFIELD to witness, that the Value of the Calf is not in the least dependent upon the Colour of the Cow.

We shall inform the Farmer what is the real Difference in Cattle that concerns their Milk, and he will see in the Course of that Enquiry, what has been the Origin of this idle Opinion.

He may remember that in a former Part of this Work, we have delivered him Rules for the Choice of his Cattle for their several Purposes; in this there is no particular Rule, for the Cow that will, when she is no longer fit for the Dairy, be best for the Butcher; will, for the same Reason, be best for the Service of the Dairy also, while of a proper Age.

Thus, in general, the Cow to be chosen for the Dairy should be large; big bon'd yet well shaped, and of the biggest Breed. This was always the Choice of the Cow, and this suits her as well for the Shambles as the Pail: when the Breeds of Cattle were kept more entire, WILTSHIRE was the Place from whence this large Kind principally came, and the Breed there was usually red: from hence it became usual to call the WILTSHIRE Breed; the red Breed; and thence instead of saying the WILTSHIRE Cow gave the best Milk, People used to say the red Cow gave the best; those two Words signifying at that Time the very same Thing.

An Error or Confusion of speaking exactly of the same Kind, gave Origin to the vulgar Notion of the black Cow bringing the best Calf. The LANCASHIRE Breed were famous for their Calves; and they were generally black: thus a black Cow, and a LANCASHIRE Cow, became two Expressions for the same Thing, in the same Manner, as we have shewn a red Cow, and a WILTSHIRE Cow meant the same; and thus it was that when they meant to say, the LANCASHIRE Cow was the best for a Calf, they named the Colour, and not the Place, and said a black Cow.

This has in each Case been the Occasion of a vulgar Error, and there is no more Truth at present in the Preference of the red Cows Milk, than in any the idlest common Saying.

While the Breeds of Kine were kept distinct, there was some Meaning in it; though in Reference to the Colour, it was only accidental; but now the Breeds are so mixed and confounded by introducing one among another, that nothing certain is to be deduced from the whole Matter.

There is another Article which does in Reality make an Alteration in the Milk of Cows; and that is the Pasturage, and Manner of feeding; but this we have, in general, considered already. The Reader will find it in our Discourse on the Cow Kind, to which we refer him to avoid Repetition.

C H A P. V.

Of the choosing a Milch Cow.

WE have in the before mentioned Place, given at large the Marks of Cattle, which

are best in their several Kinds; but in this Place we shall add for the Service of the Dairy; such Particulars as are of immediate Reference thereto; only mentioning in few Words so much of those general Directions as are needful to be remembered therewith.

Having fixed upon a Cow that is large and well shaped; let the Housewife examine whether she be gentle and kindly. This may seem trifling, but it is much otherwise. There are in these Creatures Differences of Disposition; as well as among ourselves, and it is in vain to think they can be altered; Perversenesses of this Kind are very difficultly conquered in us that have Reason, and it is not to be expected they can with Ease in such Brute Creatures as want it.

The Cow being a Creature that must be always about the House, her Gentleness is a very essential Point; and if she be of a very unruly Disposition, often it will reduce half her Value.

The principal Marks by which a Cow may be judged to be formed for Plenty of Milk, are a large and handsome Udder, with a proper Number of Teats, which is four, with no additional or ill shaped ones; but these four all long, thick, and small at the Ends.

After the Udder let the Neck be examined, this should be thin, and should have a large and hairy Dewlap.

The Horns are by many supposed to denote a large Quantity of Milk when they are short and crumpled, nor is this Mark to be utterly neglected. The Horns have no real Connection with the Udder; so that a Plenty of Milk does not depend upon them; but the best Dutch and Alderney Cows have these short and crumpled Horns, and they are superior to any other for the Service of the Dairy. The Horn being an essential Mark of the Breed in these, may therefore be considered as a Mark of Plenty of Milk.

When several Cows are to be purchased for the Dairy, it is very material to have them all of the same Kind or Breed as nearly as may be; and to take Care the Bull or Bulls, according to the Number, be of the same Breed also.

We have before observed, that the Breeds are at this Time sadly mixed, and confounded in ENGLAND; but as the Number cannot be had entirely of one particular Breed, let them be as near as possible of the same Make, Size, and Shape, according to the Rules we have laid down: and we must here repeat the Observation, that the Colour is of no Consequence: let not the Farmer trouble himself to have red Cows for serving the Dairy, and black Cows for calving: this will confound the Breed, the red will serve for both Purposes equally, if their Shape be proper, and so will the black; therefore let his whole Care be employed, as we have named already, to have them all good, and all like one another; by this Means they will herd the more kindly together, and he will have a Breed of his own better than what he at first purchased.

We have one Thing yet to mention, with respect to the Choice of a Cow for the Dairy, which is very often in the Housewife's Mouth, and

and should be always in her Mind in the Purchase. This is what they express by a particular Term, calling it Depth of Milk. By this they mean the Quantity the Cow does, or is like to furnish: and there are Ways of judging of this, without much Danger of Error.

The Time when a Cow gives the largest Quantity of Milk is, when she has newly calved, therefore let the Produce be well examined at that Time; for if it be deficient then, the Owner may be sure it will never be better.

There are Cows that have more, and others that have less Milk; or according to their Expression, Cows that are deeper in Milk, and Cows that have less Depth of it, without any visible Reason for it; therefore in this, only Experience can guide.

We have given the Rule, and the Time of judging; and we shall proceed to advise the Owner to keep or dispose of his Cows accordingly: so that by Degrees he will thus exchange or sell, and purchase again, till he have at length not a Cow in his Yard but yields as much as a Cow well can.

This is an essential Point, for if the Difference in a single Cow be something, as it certainly is; 'tis very great in the Produce of a Number; and this is a Certainty that the Quantity of Milk does not depend upon the Quantity of Food, though the Quality of it often does upon the Nature of the Food.

A Cow that is starved will not yield much, that stands to Reason; but if a Couple of Cows be watched, one of which is deep in Milk and the other not, she that is the least profitable, will be found to consume as much Provender, let it be of what Kind it will, as the other.



CHAP. VI.

Of the Quantity of Milk yielded by each Cow.

THE Reader has just seen that there is a great deal of Difference in the Produce of Cows for the Dairy, when no particular Cause can be assigned; and there is also great Variation in respect of the Age, Time, Breed, and Size of the Cow, so that it is not only difficult but impossible to fix any Standard or Measure of the Quantity a Cow should, may, or ought to yield: yet that the Owner may form some guess whether his Dairy be supplied moderately, poorly, or very well, we shall give some general Calculations of what may be expected. This is all that can be done in such Cases; and this, though not capable of being brought to Exactness or Certainty, yet is of great Use.

Not only the Nature and particular Constitution of the Cow, will make a great deal of Difference in respect of the Quantity of Milk; but the Time of her calving, and the particular Circumstances relating thereto. These vary so much in different Cows, that they prevent the Certainty of that Rule which we have in general laid down for judging of the Depth of Milk, from the Quantity yielded just after calve-

ing; and these Particularities are to be weighed and considered: let not the Farmer therefore think the less of that Rule because there may be an Exception to it, from the particular Constitution of the Cow; but remember that all general Rules admit some Exceptions; and let him judge, both in respect of what has been said, and of what we are about to say accordingly.

Let him observe what Milk his Cow yields soon after calving, whether it be more or less, and mark her down accordingly; but though he set down that which yields a great deal at this Time for Keeping, and that which yields but little for Sale; yet let him continue both in his Yard through the Year, and examine them as they go on.

Often a Cow that gives a great deal at first, soon falls off in that Respect, and yields less than another; and there is this farther Difference, that some go dry a Month, two Months, and some three Months, before they calve again, whereas others will yield their Quantity to the last. I have known them do it even the Night before their calving. This therefore is to be considered; for the same Cow that is deep in Milk once, will continue so; and in the same Manner, she that one Year gives little, will not be easily made to yield more another.

It often happens that one of those which yield a great Quantity when they have first calved, will grow dry ten Weeks or three Months before calving again; and on the other hand, that one which yields moderately at first, will continue it till the very Day of her next calving.

Now when a Cow yields but little at first, she can never be worth keeping for the Dairy, and therefore should be disposed off at once, and her Place in the Yard supplied by one more profitable; but a Cow that yields moderately, though not greatly, and continues it the Year round, may be worth more to her Owner than one of those that yield a great deal at first, and grow dry for several Weeks. This must be carefully regarded; for the Value or Preference of one of those Cows over the other, cannot be made without a Computation of the whole Produce for that Length of Time.

While this Observation gives the Farmer a Caution not to be too hasty in judging of the Value of his Cows, it at the same Time sets in a clearer Light, the uncertainty and difficulty we have before named, of making any Computation strictly of the Quantity to be expected from a single Cow; we shall, however, speak as we proposed in general to that Point.

A great deal depends as to the Quantity of Milk upon the Time the Cow is to calve; and as this makes so great an Alteration in the annual Produce, we cannot state the Account without it.

The best and most favourable Time for the Cow to calve, in order to her yielding the greatest Plenty of Milk is, when the Pasture is springing in all its Strength, for then it will make the greatest Supply. Therefore those who wish for Abundance of Milk, are very happy if their Calves fall in the End of March, or the Beginning

Beginning of APRIL, for at that Season the Grass is in its fullest springing Strength. The Calves at this Time indeed are not profitable for rearing, because they must be fed upon the Cow's best Milk, which is not the Case of those that fall latter; but an early Cow, the Calf being considered as to be sold to the Butcher as soon as may be, is vastly preferable in Point of the Abundance of Milk, to one that falls later.

To speak of the Milk in its most favourable Time for Quantity, and under the most favourable Circumstances, we will compute that of a new milch Cow first turned to Grass in APRIL. The Produce of such a Cow at such a Time, according to the different Accidents we have named, may be computed between five Quarts and twelve at a milking; and many of these Accidents have Causes so beyond our Reach to know, that it is often impossible to guess any thing about the Difference before hand. Three Gallons, WINCHESTER Measure, at a Time, is a very great and rich Produce; two Gallons is a very fine Quantity: a Cow that gives five Quarts at a milking, which we have set at the lowest worth keeping, is a very good one, if she will continue it the whole Year round; so that she is worth trying; but the Cow that yields less than a Gallon is utterly to be rejected, and her Place supplied by another. In general, the Cow may be said to yield very well that gives a Gallon and half at a Time, if there be a proper Continuance of that Quantity. If this be properly managed it will yield a sixth Part Cream, that is, one Quart of good rich Cream for every Time of milking each Cow; and this will yield very well a Pound of Butter.

This is the Computation the Farmer ought to receive as a Medium, he may rest satisfied with a Cow that gives less, and he may have one that yields much more, not a great deal to his Advantage; because those great Yielders, as we have observed before, do not hold out like those which begin, as the Expression is, fair and softly.

It will not be difficult, from this moderate Estimate, to compute what the industrious and careful Housewife will make of a good Number of Cows, the Produce is easy from one to many, when the common Quantity is known.

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CHAP. VII.

Of the Times of milking.

THE two great Points upon which the Profit of a Dairy depends are the Hours of milking, and the proper ordering of the Milk when it is brought into the House. The first may seem to many a small Concern in Comparison of the other, but those who have had Experience for their Guide know 'tis of great Importance.

A Cow should be milked always twice in the four and twenty Hours: there are those who approve of three Times, but to speak from Experience I must have Leave to say, that it is Trouble employed to Loss; for upon Trial I

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have found that the Quantity of Milk obtained at twice milking at twelve Hours Distance, has been more than that got by three Times milking at six Hours Distance in the Day, and leaving the Night for Rest entirely.

This last Practice, however recommended by some who have written well on these Matters, and however approved by some who think themselves good Housewives, proves on Trial to be faulty and erroneous: 'tis only a teasing of Nature: 'tis expecting what cannot be performed, for a Supply worth taking, or needful to be taken, cannot be made in less than twelve Hours; and beside, Nature loves Regularity; and in our Way of two milkings in the four and twenty Hours, each may be at twelve Hours Distance; whereas in the other, the common Way is to have two Intervals of only six Hours each, and one of twelve.

Those who understand the Conduct of Nature in the Bodies of Animals, know that there is not this Difference to be made between the Hours of eating and of rest; for though the Creature eat only in the Day, the Work of Digestion goes on all Night, and therefore the Times of milking ought to be at regular Distances: this also is shewn by Experience, because we find a Cow with an Udder full in the Morning after sleeping, as well as in the Evening after the whole Day's feeding.

There are Cows that it is said require three Times milking in the four and twenty Hours, because otherwise they will shed their Milk: this would seem an Objection to what I have endeavoured to establish as a Rule; but from all that I have seen, this Necessity has been owing to nothing in regular Nature, but altogether to one of these two Causes, either to a Custom of doing it, or to some Distemper in the Udder, or in the Nature of the Milk.

Whatever Nature has been accustomed to, that she expects; therefore if a Cow have been used to be milked thrice a Day, she will require it, but the Quantity, as before observed, will not be at all more than if she were milked only twice; as to the other Case, of her shedding the Milk if not taken at these Times, it is to be considered as a Disorder, being certainly no other; and certainly what a sickly or distempered Creature requires, is not to be made a Rule for the Management of one that is in Health.

From this, and from all I have seen, and all the Observations I have been able to make from repeated Trials, I am convinced that two milkings in a Day is as much as any Cow in a State of Health can require; and that the greatest Quantity of Milk is obtained under this Management.

Having established twice in the four and twenty Hours, as the proper Periods of milking, the next Thing is to settle at what Time it shall be done. But this is a Thing more liable to Uncertainty than the other. In many Places there are certain stated Hours for the Sale of Milk, and when any considerable Quantity of it is intended to be disposed of in that Way, the Times of milking must be adapted to those Hours: thus in and about LONDON, and other large Towns, there are certain Hours at the which Fa-

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milies are used to take in the Milk for their Occasions, they therefore expect it at these Times; and the Retailers are used to have it at the Hours just before; so that the professed Cowkeeper, who intends this Use of his Milk, must accommodate the Times of milking accordingly.

On the other hand, the Country Farmer who keeps his Dairy for his own Use and Profit, and set the greatest Part, or in a Manner all that his Cows yield, for Cream, may take what Times of milking he pleases; and then it is his Business to chuse such as are most natural.

In Summer, when the Days are long, the most natural, convenient, and advantageous Times are Morning and Evening: no Hours are so well as between six and seven in the Morning, and toward seven in the Evening. There are no Hours of the Day at which the Udders of the Cows are so naturally distended with Milk; consequently none at which it is so natural, or so much an Ease to themselves to milk them, or at which they yield so freely.

The Morning gives the Milk formed in the whole Night's Rest and Digestion; and the Evening gives that made from the abundant Food of the Day; Part of which, from the Quantity taken in, must be converted into Nourishment at the Time; the Remainder during the Hours of Repose. We have, in a preceding Chapter, informed the Farmer how Milk is formed and produced, therefore this Account will be familiar to him.

As the Days lengthen toward MIDSUMMER, these Hours may be made a little earlier and a little later, but not much; as the Days shorten after MIDSUMMER they must of Necessity be changed for such as are considerably later in the Morning, and considerably earlier in the Afternoon.

As to the third Time of milking, those over-industrious Persons who approve of it, generally make it six Hours after the Morning milking, which places it six Hours before the Evening Time in Summer, and makes it about the Middle of the Day. We have already shewn that it is prejudicial to the Creatures, and of no Advantage to the Farmer; and we may add, that as it requires more Trouble and Attendance of Servants, it necessarily brings on more Expence, which is another Disadvantage.

From what I have seen of the milking Cows three Times a Day, I think I have Reason to imagine that it makes them dry up the sooner. I had been led to believe at one Time, that it would be a Way to keep them in Milk the Year round, and made Trials in my own Stock, carefully minuting down the Observations, which I expected would have shewn this, but the Effect was exactly the contrary: so that seeing the Matter in all its possible Lights, this third milking is a disadvantageous Practice.

I have met with some Farmers who have been strongly of Opinion, that the Cow's keeping in Milk to the Time of her calving again, was not to their Advantage; for that the Milk being drawn away all that Time weakened the Calf. This is another of those specious Reasonings which nothing sets aside but Experience. I have examined and observed this Difference in respect

of the Calves, not once or twice, but many repeated Times, and can assure the Farmer, from what I have thus seen, that a Cow's yielding Milk to the very Time of her coming again, is no Disadvantage at all to the Calf that is to come, but rather a Help. From these Observations what I have learned is this, that a Calf in the Body of the Cow is much more likely to have too much Nourishment than too little; and that for one which comes into the World poor and starved, twenty come full of gross Humours. At the same Time it is to be observed, that want of Nourishment is a Fault soon mended; for the Milk is rich and abundant, so that rarely any Harm happens from this; whereas the bringing into the World with them an Abundance of Humours and a Grossness of Habit, is commonly their Destruction.

Therefore it appears on all Hands, and from a Comparison of all Things together, that it is greatly to the Advantage of the Farmer, that his Cows should go the Year round with Milk, and consequently that it becomes his Interest to watch and observe them the whole Time; for that a Cow that yields but moderately, and continues it without any Interruption, is better for him in every Respect than one that yields an Abundance at first, and grows dry afterwards. This is not the common Opinion, for that is on the contrary Side, but the Truth lies wholly here; and therefore the Experience is the more useful.

CHAP. VIII.

Of the Manner of milking.

THIS may seem a Consideration too trivial to have a Place in such a Work as ours, but we shall not therefore neglect it: nothing is trivial that may prove of Consequence; and it is to this single Vanity of over-looking Things of Importance, under the Name of frivolous and unworthy Consideration, that the greatest Part of the Writings on this Subject are wholly useless.

The Operation of milking indeed is very trivial and very easy; but as easy as it is 'tis not enough understood. It is entrusted to Persons who have little Sense or Consideration, and who learn it they don't know how; nor does the Owner ever concern himself whether they do it well or ill.

There is a great deal of Difference between handling the Teats gently and roughly; and some Knowledge is required to tell how the Milk shall be got with most Ease to the Creature.

Milking, when carefully performed, is an Ease and Pleasure to the Cow; but it may be so managed, and it too often is, that 'tis a Pain and Torment to her.

We have observed that there are Cows naturally ill-conditioned, but these are not common; the greater Part of the Accidents that happen in this Way, and are laid to the Fault of the Cow, are owing to the rough and ill Conduct of the Persons employed to milk her.

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The Farmer also is not unfrequently distressed by the Disorders of the Cow's Teats, and the Hedgehog at this Time is blamed, as the Fairy used to be accused formerly of being the Occasion of those Disorders; but in general, the Urchine is as innocent as the Spirit; and the Disorders are owing to Hurts in the handling of the Teats.

Having thus represented to the Farmer the Mischiefs that arise from an unskilful Way of milking, and the Necessity of its being performed in a better Manner; we hope he will not accuse us according to the vulgar Custom, of descending too low in the taking it under Consideration, nor neglect the practical Directions we shall give upon the Subject. His knowing what is proper to be done is the most important Consideration of all, for he will be able to say what is right and what wrong; to instruct the ignorant, and to over-look the opinionated: now and then giving an Eye to the Matter himself, and giving his Instructions where they are wanted, and Reproofs, where they are deserved, will set all right, and occasion his Business to be conducted in this Point much more to his Satisfaction and Interest than he could otherwise expect.

When the Milker goes to her Work she must take the near Side of the Cow, and begin by gently handling and stroaking down the Teats; and from time to time she must moisten them with Milk, to make them supple and pliable; and by this Practice they will be brought to answer to her Touch much better, and will yield the Milk more readily and freely, and that without any Pain to the Creature; indeed on the contrary with Pleasure.

There is palpably all this Difference in the Manner of milking. The Quantity in the Udder is a Burthen and great Weight to the Cow, and she wishes earnestly to be relieved from it; but if that be done with Harshness, so as to occasion more Pain for the Time than the Load of Milk, then she will avoid it: on the other hand, if she be milked kindly and gently, beginning as we have directed, not only the easing her of the Load is a Relief, but the very Manner of doing it is a Pleasure. Every Mother who has given Suck knows there is a Pleasure in performing that Office to the Infant, independent of any Thought of the Mind: this Pleasure is in the Nipple itself, and this the whole Creation of Female Creatures that give Suck have; and it is the same in milking as in sucking.

To this rude Method of handling the Teats is owing, as we have said, a great deal of the ill Disposition of some Cows; and to the kind and gentle Treatment others receive it is owing that they are kind and gentle themselves. A Cow that is well fed will have her Udder full at certain Times, and when she knows she can be relieved from that Load without Pain, she will come of herself to the Pail, and will stand with all possible Satisfaction.

We have said in what Manner the Milkmaid is to begin her Work, and shall add how she is to continue. She must not fix herself, nor set her Pail firm to the Ground, till she has got the

Cow to stand sure and quiet: these Creatures are often very restless in the Beginning, but they will stand still enough when the Milk has come for a little while freely. This must be watched, because the Milk that is got will be otherwise in Danger. The Cow is a heavy Creature, and a little Kick of her Foot will bring the Pail down.

When she is once settled, and the Milkmaid is seated, and all goes on for some Minutes right, there is less Danger, but still the Woman must be always upon her Guard, a Cow may start at any Time, and she must have her Eye upon all her Motions, and her Hand upon the Pail, ready to remove it upon Occasion, otherwise the overturning of a Pail is very easy, and the Milk may be all lost in a Moment, that this careful Eye might have saved.

When the Cow is quiet and seems pleased with the milking, then let the Woman go on boldly; that which would have pained the Creature cruelly at first, will not hurt her at all now, that the Teats have been handled, moistened, and rendered supple; let her therefore now pull and strain them freely, and draw as long as any Milk will come.

This last Article must be treated of more largely than in those few Words. The worst Fault a Milker can be guilty of is, the not doing it clean and thoroughly. Let the Farmer or his Wife frequently see to this: they should give all their Milkers Orders to take Care, that not a Drop of Milk be left in the Udder when they leave off; and they should see at Times, when they are at their Work, whether those Directions are punctually followed. If there were nothing but the Loss of so much Milk as is left in the Udder that is but half drawn, that would be some Consideration, for in a Number of Cows it would amount to what was considerable, and this twice a Day would, in the Year's Course, make a great Diminution in the Profits of the Dairy: perhaps this alone would make the Difference of four or five Cows in a Year, and the Farmer knows the Value of their keeping well enough, to be sensible what a Fault that would be. But there is a much greater Consideration than this, for there is nothing that tends to keep a Cow so full in Milk, as the constantly milking her quite clean; and on the other Hand, there is no Way so sure to make her soon dry, as the milking in a careless Manner, and always leaving some behind in the Udder.

This depends upon the Course of Nature in furnishing the Udder with Milk, as we have shewn. While it is drained Nature gives a continual and constant Supply, whether that draining be done by the Mouth of the Young or the Hand of the Milkmaid; but as soon as no more is drawn no more is provided. This is the Case at large when the Young dies, or the Creature is any way left untouched; and the same Thing holds good, in a proportioned Degree, when she is carelessly milked, and the Udder not well drained.

When that is perfectly emptied at Times, Nature goes on vigorously with a Supply; but when it is done but imperfectly she performs her Work languidly, and there is not that free and full Supply

Supply any longer. The Farmer knows the Importance of keeping his Cows deep in Milk, and a long Time in it; and it is fit he should perfectly know, and thoroughly consider how much that important Article depends upon the Milk-maid's doing her Duty.

Another Caution to be given to all Milkers is, that they make themselves as familiar and friendly with the Cows as possible. By Gentleness and kind Treatment they will come to know them, and will go to the Pail like rational Creatures. While they are milking common Discretion will teach the Person not to do any thing to startle or frighten them; and it is a good Caution also to let them go quietly and easily away. I have seen many drive their Cows away hastily and roughly, as soon as they had done, as if they never were to have any thing to do with them again. All Creatures have Memory: the Cow does not forget this; and it is that makes her shy or troublesome the next Time: let them always be treated tenderly, and let them go peaceably as they come: there is no other Way to have them come peaceably again.



C H A P. IX.

Of ordering the Milk in the Dairy.

THE Farmer has seen every Article necessary to be done in the obtaining his Milk from the Cow, let him now take Care of it when he has got it: he has taken the proper Measures for having the best Cows; for getting the most from them; for keeping them long to it; and for avoiding Mischief in the drawing it; we will suppose it therefore in the Pails, and bringing Home; and that he is desirous to make the Dairy fit to receive it in the best Manner.

The first Thing, and the most important of all in a Dairy, is Cleanliness. Not only all the Vessels and Utensils, but the very Floor, Walls, and Cieling; every thing that is in it, and every thing that is about it, must be thus managed with the utmost Nicety of Cleanness, or there will be continual Damage and Loss.

The great Article in a Dairy is to keep all sweet; and there is no Way to keep Things sweet like keeping them perfectly clean: this Reason dictates, and this Experience confirms.

The Dread that should always be uppermost in a Dairy is of Sowerness: and to keep Things from sowering the Receipt is the same; that is, keep them clean.

Milk will at the best keep but a little while. All the Art and all the Care in the World cannot keep it long: it will become sower, and there is the great Damage. When it has once got sower it will spread the Mischief, and this is what the Mistress of the Dairy is to employ all her Care to prevent; and the far greatest Part of that Care centers in the same Point Cleanliness.

The Foulness of a Dairy is usually from corrupted Milk or Cream, and this must be cleaned away perfectly, for it will otherwise not only communicate itself to whatever is near it, but will

infect the very Air of the Room, to the Prejudice of the whole Quantity of Milk that is brought into it, and of every thing that is going forwards. What the old Wives used to attribute to Witches and Fairies, was in reality the Effect of something sower left in the Dairy: this was the natural and real Cause, but the Effects of it are so great and so perplexing, to such as do not know the Cause, that no Wonder they thought Witchcraft had a Hand in it.

Here then lies the first Article of Cleanliness, which is to take Care no spoiled Remains of a former Business hang about the Dairy, nothing sower remain in any Crack or Crevice; for this End all the Pails, Pans, and Vessels, must be daily perfectly cleaned; and for this Reason glazed Earthen Ware is preferable to any other Materials for them, because nothing sticks to it, there are no Crevices in it, and one may always see whether it be clean.

Those who are at all acquainted with the Business of a Dairy, know how nice and ticklish all the Works of it are; therefore let them take Care not to add to the Hazard or Perplexity by Foulness. We have mentioned the Remains of any thing sower as the first Article, because that is a Mischief that spreads so quick and so far, but we are also to caution the Housewife against Grease, Dirt, or Filth of any Kind whatsoever; for every thing that does not belong to the Work of the Dairy hinders it.

There is no Way to clean and sweeten the Vessels, but by scalding them with boiling Water, and then setting them out in the Air: the first cleanses off all Filth that is visible to the Eye, and the latter removes any Taint by purifying and evaporating any thing that remained about them. There is nothing equal to the Sun, Wind, and Air, for purifying Things after proper cleaning, and this Practice should be used in the Dairy every Day, whether the Things appear dirty or no; there may be Filth about them that is not seen, and the least of it will do Mischief.



C H A P. X.

Of the Vessels of the Dairy.

THE Use of the Dairy is to produce from the natural Milk, such Products as the Farmer shall find turn best to his Account; and the several Vessels employed in it all tend to that Purpose. These we are to consider in two Lights, with respect to their Form and their Materials.

As to their Form we are not ignorant of the many new Inventions that have been started for the facilitating the Operations of the Dairy; nor do we utterly advise the Farmer from regarding them; but this Caution we shall give him, that he do not rely too much upon the Words of their Inventors, or of those who have so warmly recommended them. These have been in general People of Ingenuity, but of no Experience. They have seen the Conveniences that might attend something of the Nature of what they proposed, but they have not perceived what might be the In-

Inconveniences of their own particular Inventions, therefore the Farmer, or practical Dairyman, is to try before he approves: he is obliged to those Gentlemen for the Hint, but he is to determine for himself, for he can do it much better than they, whether that Hint can be reduced to Practice.

Thus it is the reasonable Husbandman will consider all that is offered for the Improvement of his Profession, neither rejecting at Random, nor adopting without Proof. Many Things appear very feasible in the Closet, that are utterly impracticable in the Field: there is therefore no other Way of judging of them than by the Help of that Experience first, which their ingenious Inventors wanted; and afterwards, if this Experience joins in the Opinion, then to bring them to a Trial.

'Tis thus we advise the Farmer to consider the several new Improvements of a Dairy; and having given him this Hint, or if we may use the Expression, this Rule of Practice with Respect to the new, we shall proceed to inform him in the Management of the old and accustomed Methods: these are sure, and to confess a Truth disagreeable perhaps to the Inventors of new Schemes on this Head, I have never yet found upon Trial, that any others, with all their specious Promises, exceeded them.

As to the Materials of which the Vessels for the Dairy should be made, we have already declared for glazed Earthen Ware; but that not so absolutely as to reject those of all other Kinds.

People of Fortune who have amused themselves with the Pleasures of a Dairy in the Country, have covered their Walls with Dutch Tiles; and had their Vessels of China, and this is extremely right. As to the Vessels, China are in this Respect as good for Use as glazed Earthen Ware, but not in the least better, for they are covered in the same Manner with a Glazing; and so a Vessel be glazed, and the Glazing whole and without Flaws, 'tis no Matter whether it were done in the EAST INDIES or at Home. There is a Difference in the Materials used in the Manufactures of EUROPE and the East on this Occasion, but it is not material in this Consideration. Our Glazing for these Vessels is made of Lead, and theirs is only a kind of Earth mixed up in Water, but the Effect is the same. Either is a glassy or shelly Substance which the Milk cannot penetrate, and therefore they equally answer the Purpose.

As to the covering the Walls with Tiles it is certainly right, as it answers two Purposes, both very essential to a Dairy, Cleanliness and Coolness. I have seen a Dairy in WILTSHIRE lined throughout with Lead, and it had also a very good Effect. The Expence of this last Method will appear considerable at first, but taking in the whole Account nothing is so cheap. It lasts from Generation to Generation without Repairs, and it has always a very considerable intrinsic Value: so much Lead is worth so much Money at any Time.

The usual Kinds of Vessels are three, Earthen Ware glazed, Wood naked, or Wood lined with Lead. As to the first we have spoken,

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the second is very good, but it has less natural Coolness, and is not so easily made perfectly clean as the Earthen Ware; the Lead has all the Advantage of Coolness, and may easily enough be kept clean.

The Difference is not very great, but the Reason will easily be seen in what we have here said, why we give the Preference to the Earthen Vessel.

Where the Dairy lies low, and is in itself very cool, Wooden Vessels do better than elsewhere; and where there is a very great Business carried on, there is Convenience in Wood lined with Lead, because Vessels may thus be made of such a Form and Bigness, as cannot be had from the Potteries. On all Occasions the Shape of the Vessels should be broad and shallow: this answers two Purposes, for it makes the Milk yield the largest Quantity of Cream, and it keeps it the longest from sowering. It is a Rule founded upon repeated Experiments, that a Quantity of Milk under the same Circumstances otherwise, will always sower the sooner, the deeper it lies together in the Vessel. Upon these Principles, founded on Experience, not on any fanciful Theory, stands the whole Matter of the preparing a Dairy for the Reception of the Milk.

C H A P. XI.

Of setting the Milk for Cream.

THE Dairy is now ready for the Milk, and that is coming Home in Pails upon the Shoulders of the Milkers, the Vessels in which it is to be set are placed ready to receive it; but there is one thing to be considered previously to its being put into them.

We have taken Care that there be no Dirt in the Dairy, let us take the same Precaution that none come into it from the Field. Too much Cleanliness can never be recommended to the Milkmaids, but let them take what Care they will; they can never keep their Pails perfectly free from Dirt, or some accidental Foulnesses. The Hairs from the Cow will fall into them, and other little Matters of the same Kind may also. Now all these, however they are blended among the Milk, would rise with the Cream, and so not only disgrace the Housewife, but disturb all the Operations that are to follow; for we have shewn that any the least Filth will perplex and tease the whole Management afterwards.

To prevent Accidents of this Kind the Milk is to be strained; and this is to be done in a very easy and familiar Manner, by Means of what the Housewife calls her Soiling Dish, or as they commonly speak it the Syle Dish. This is a wooden Bowl, with its Bottom cut out, and the Opening covered with a Piece of fine clean Linnen Cloth.

This Bowl must be every Day scalded, and set out in the Air to sweeten like the rest, and Care must be taken that the Cloth be always perfectly clean. Through this Dish the Milk is to run into the several Vessels prepared to receive it, and then it will run perfectly clean and pure, for the hollow'd Bottom will stop the

smallest Particle, and thus nothing but the Milk can get into the Vessels.

Thus far then we will suppose our Housewife has provided with perfect Care and Regularity, her Milk is perfectly pure, and is in the Vessels perfectly clean: there is therefore no Danger of any Injury to it, and 'tis now to be left to Nature. The Dairy is cool, clean, and quiet, this is all that is needful, or can be done to promote the gathering of the Cream: properly speaking nothing can be done to promote this, for it is a natural Procedure, and must go on in its own Way, all that can be done is to prevent Dirt, Heat, or Disturbance; and this we have contrived already to do in the Structure of the Place.

The Milk, as we have shewn, is composed of different Parts: these are kept mixed while it is in the Body of the Animal, but they separate one from another when they are out: this is that Separation which prepares for the Operations of the Dairy. The rich and fatty Part separates from the poor and watery; that is, the Cream rises to the Top, and leaves the thin and watery Part at Bottom. The broader and shallower the Vessel is in which it is set, the more freely, easily, and readily this Separation is made; that is, the sooner the Cream gets to the Top, and the greater Quantity there will be of it, these are the two great Points the Housewife desires; therefore she will always use such Vessels.



C H A P. XII.

Of Skimming the Cream.

WE are sensible how lightly many of these Things are in general looked upon, that here make the Subjects of so many distinct Chapters, but it is to that want of Consideration of what are called Trifles, that half the Disappointments and Losses in a Dairy happen. It may easily be said that every Housewife knows when her Cream is risen, she is to skim it off: that is true, we do not take up her Time in telling her that she is to do it, but we are about to acquaint her how she shall do it to the greatest Advantage; and from what we have seen of Dairies in some Parts of this Kingdom, no Part of Information relating to the whole Farm is more necessary.

We have recommended Cleanliness in every Article relating to the Dairy, but here we are to repeat that Lesson. There is nothing that requires more Nicety than the skimming off the Cream, nor any Article in which a little Dirt can do so much Damage.

We will suppose the Milk to have been brought in in the Morning, according to our Directions for the Summer milking, about Seven o'Clock; toward Afternoon let the Skimming Dish be cleaned and got ready, and the Vessels that are to receive the Cream. The Skimming Dish should be of a convenient Size for the Hand, not too deep, and thin at the Edges.

The Time that Milk should stand is a Point in which few are agreed, and about which most

err. I shall endeavour to set the Matter in as certain a Light as its Nature will bear: perfect Punctuality cannot be expected in any Rule on such a Subject, but being in one Article established, the Housewife may vary according to her Discretion, as the Circumstances vary: and it is better to have a Rule fixed for one Season and Kind of Weather, than to have none fixed at all.

In Summer then I shall say ten Hours is in general enough for Milk to stand. Therefore this Milk having been brought in at Seven in the Morning, will be ready to skim at Five in the Afternoon; and this will be a very convenient Time to the Housewife, because what she is now doing will prepare for the Evening Milking.

Many let their Milk stand longer than this in Summer, and consequently vary according to the Circumstances at other Times, but by what I have found from repeated Experience, there is no Rule so proper. 'Tis a very nice Point, and of very great Importance, either Way an Excess or Defect may be of great Damage; if the Milk be skimmed too soon the Housewife has not her full Quantity; and if it stand too long the Butter made with it will suffer.

The first of these Points is plain to every one, but the latter is not sufficiently known; or at least not enough regarded. When Milk stands too long without skimming, the Cream gets a thick Head, and is untractable, and the Butter that is made of this is always bitter. I have known this in Instances out of Number, and when I have convinced some Housewives that it was owing to this Fault of letting the Milk stand too long, they have tried every Method that could be thought of to prevent the Effect, but in vain: I have known them boil the Cream that was thus taken from Milk which had stood too long, in order to prevent this ill Taste in the Butter, but to no Purpose; it has still been as bitter as if nothing were done to prevent it.

What all the Pains and Care imaginable cannot remedy in this, as in many other Cases, may easily be obviated, and that is the Lesson which we give to the Housewife. Prevent the Damage by skimming in Time.

We have given this Instance of the bad Effect of letting Milk stand too long, nor is it the only one by many, but it is so plain, and a thing so easily in every one's Power to try, that it is, we hope, sufficient. Therefore, according to our Rule, let the Milk be all skimmed at Five o'Clock in the Afternoon, and let it be put into a proper Vessel. The best Vessel is an Earthen Pot well leaded, with a Cover. When it is put into this let it be set by in a close cool Place.

The Cream is now taken off, put into the Pot, and set by, an Hour or more has been employed in this, and in cleaning the necessary Vessels, and by that Time they are got in and set in order 'tis Seven o'Clock, and the Milkmaids come in loaded from the Evening's Milking. The Milk is to be strained and managed exactly in the same Manner as the first, so there needs no particular Direction on that Head; and we shall therefore, to avoid Repetition, suppose the same Business gone through, and the Milk all set as the first.

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The Housewife may now be quiet for the Night, but let her take Care to be up early in the Morning. The next Article to Cleanliness is early rising in this Business, and it is need she be up, for the Milk she has set over Night will be ready for skimming after ten Hours, or half an Hour more, that is, by Five, or soon after Five in the Morning. In general it will be best to allow half an Hour longer standing during the Night than in the Day, because the Night is cooler; and Experience shews that the Warmth of the Air has a great deal of Effect in the throwing up of Cream.

In this Manner the Cream will be taken off from the Evening's Milk; and all got ready for the Reception of that of the Morning, by that Time the Milkmaids come Home with it; and thus the whole Round of that important Article, the obtaining, setting, and skimming the Milk, will be managed without the least Trouble or Perplexity, and every thing go on in a quiet and regular Order.

C H A P. XIII.

Of the Management of the Cream.

IN the Close of our last Chapter we left our Housewife with her Pots of Cream, and her Dairy Work going on with due Regularity, we must proceed to advise her how to manage the Produce of her Pans in the best and most satisfactory Manner.

In this Article there is Need of the greatest Caution, and that for the plainest Reason in the World, which is, that Convenience would naturally prescribe the keeping it longer than it is found in Effect safe or proper to do.

The Weather makes a great Variation in this Article, and we are to observe also, that there are artificial Ways of assisting Nature in preserving it. However, as pure sweet Cream, in its natural Condition, is vastly preferable to the best that is preserved in whatever Manner by Art, we shall first give the Housewife her Lesson how long she should, and how long she may keep it naturally; and afterwards inform her what may be done in the keeping it longer by Art and Management.

The finest and most excellent Butter is that which is made from Cream that has not stood above ten Hours in the Summer; on the other hand, in Winter it may be kept much longer without Damage. When we name the Time of ten Hours, it is by Way of limiting the Space in which it is quite perfect; for Butter that is made from Cream ten Hours old, or from such as is just skimmed is altogether the same. After this, in Summer it begins to find some Change, but it is little for the two succeeding Days, only in general the newer the better.

The Season makes so great a Variation in this Matter, that Cream may be kept very well twice as long in Winter as in Summer.

In Summer it may be kept without any material Disadvantage two Days and a half; and in Winter it may be kept in the same Condition five Days.

The Housewife who intends to have Credit in her Butter, if she takes Care not to let the Milk stand too long before it is skimmed, may very well keep it thus long without any particular Management; but if she intends to have more of it together than can be got from her Stock of Cows in that Time, or to churn but at certain Times, which require the Cream to be kept longer, then she must use some Art to preserve it.

In this Place however it may be necessary to observe, that in making Butter for Sale in large Quantities, there is no Objection to the Cream being kept longer. In this Case it turns sour; but the Butter is not the worse for Market, unless it have been over-heated or otherwise ill-managed in the Churn. The fine Butter for present Use should always be made of perfectly fresh Cream; but for this marketable Commodity the other is rather preferable; for Experience shews that Butter made otherwise under the same Advantages, keeps better when the Cream has stood to be sour, than when it was so perfectly fresh, unless it turn bitter: this, in Butter made from Cream that has been kept till sour, is always a Mark, and is always the first Mark of its tending to Decay; wherefore in that Case, the sooner it is used the better.

The fine Flavour depends on the Freshness of the Cream, but otherwise the Butter is not the worse for some keeping.

These are Particulars we shall consider more particularly in a succeeding Chapter, treating of Butter; but thus much it was needful to say here, that the Housewife may exactly know not only how long her Cream is to be kept, but what are the Disadvantages of keeping it longer.

Having explained this Matter so far, we shall proceed to tell her what is to be done, when she is desirous of keeping it longer than it is possible for her to expect it naturally to last good.

The Days of Market often regulate the Days of churning: there is some Convenience in doing a good deal of Business in that Respect at once, and when there is but one Market near, and that but one Day in the Week, which in the Country in many Places is no uncommon Thing, it will be a great Convenience to the Housewife if she can contrive to churn but once in the Week, and to prepare all together for the Market. We shall suppose this the Case, as it is a very common one, and lay down a Method by which she may in Summer be able to keep her Cream the whole Week without its growing sour, though in the common Course of Things it would be so in three Days.

This is to be contrived thus. We will suppose the Market Day THURSDAY. Then FRIDAY may be called with her the Beginning of a new Week; but as her Cream will have been gathering sooner, we shall trace it from that Time.

In order to prepare for the Market on THURSDAY, she has been churning on WEDNESDAY, and she will have taken into her Churn the Cream of WEDNESDAY Morning, that is, what was skimmed from the Milking of TUESDAY Evening, the last that can go into the Account of that Week.

The WEDNESDAY Morning's Milking is set for

for Cream, and that is taken off at Evening, but set by, this therefore is the first Parcel for the succeeding Week: to this is to be added all that follows till the WEDNESDAY Morning again, which she is to preserve for the Churn on that Day: Let every succeeding skimming be mixed with this first; and on SATURDAY Morning let her set all the Cream she has got over the Fire, and let it just once boil: this done let her put it back into a clean Pan, and then add to it all that is taken off the Milk during the following Part of the Week, but let her every Day change the Vessel in which it is kept, pouring it daily into a fresh one well cleaned and aired.

It is very strange to see the Effect of this, the boiled Cream not only keeps good itself, but by the Practice of every Day putting into a fresh and perfectly clean Vessel, it preserves all the rest from being sour. This has been frequently tried in the Neighbourhood where I now live, and when it has been done with due Care has always succeeded.

We have now conducted the Housewife from the milking of her Cow to the preserving of her Cream, as long as her Convenience requires, and as it is then to be made into Butter, that comes next under Consideration.



CHAP. XIV.

Of Butter.

WE have observed that Butter is the oily or fatty Part of the Milk, which first separates of itself in Form of Cream, and after that needs but little Trouble, at least but little Art to bring it into the Condition of an elegant solid, yet soft Substance, pleasant to the Taste, and fitted for many Purposes.

When we consider Butter in this Light, of a Thing so very desirable, and so very easily obtained, it appears wonderful that the Knowledge of it came so late into the World; but 'tis certain that there were very many Ages in which it was not known, and many Countries in which it was not used in Food long after the rest of the World were perfectly acquainted with it.

The Greeks, Poets, and Philosophers frequently mention Cheese, and yet the Name of Butter is not found in their Writings. It is certain that the only Use they made of Milk in those Times was to drink it alone, eat it with Mixtures, or make it into Cheese; for not only they are silent on the making Butter, but it is evident from the whole Tenour of their Writings, there was no such Thing in use among them.

ARISTOTLE has written largely of Milk and its Products, but among these there is not a Word of Butter; he only treats of Cheese of several Kinds, and the Whey, of which there were also several Sorts, according to the Manner of making the Cheese.

The ROMANS made Butter, but what is yet more strange than the former, they, though they had it, never considered it as an Article of Food; they used it as a Medicine; and we read their Sentiments concerning it in PLINY, where we find they were well acquainted with its Use in

other Countries. It is very well known that the People of the EAST INDIES knew nothing of Butter, till the Dutch took it over to them.

We see in this an Instance of a very great Truth, which is, that the most familiar Things may be a long Time over-looked, and that what every Man wonders he did not find out himself, as soon as the Secret is disclosed to him, Millions beside himself may have left all their Days undiscovered.

Butter is made from Cream by the Assistance only of Motion: this may be given it any Way, and provided it be in a proper Degree, the Effect will be produced. This Motion in the common Way of performing it is called churning; and the Uncertainty of that has led the Ingenious to contrive many Methods of supplying the Place of beating by the repeated Labour of the Hand, some of these are much worse than the old plain Way, and there are others that really deserve the Name of Improvements.

There are certain Particularities relating to Butter, much better known than understood: it will be very well worth while for those who have the Convenience of being upon the Spot, to endeavour to discover the Reasons. In the mean Time all we can do is to mention the Facts.

SUFFOLK Butter is famous for keeping, which is a Quality of so much Importance, that every Method is to be taken in Hope of finding the Cause of it. Indeed there are Methods of making any Butter keep longer than may at first be imagined practicable; if good Butter be made up in Lumps of forty Pounds Weight, and a little more Salt be put in than is usually allowed, and they be afterwards put into a large Bin of Flour, they will keep the Year round without Damage.

Toward the End of Autumn Butter is apt to taste bitter. This is one of those Things better known than its Cause; it has been said that the Reason is, that Grass beginning to grow bare at that Time, the Cows eat the Leaves that fall from the Trees; but however true it may be that Cows will feed in this Manner, it is not true that this is the Cause of the Butter's being bitter; because in the Fen Countries, where there are no Trees, and where Ditches serve instead of Hedges for inclosing, the same Thing is apt to happen at the same Season; as in Places where there is ever so great Plenty of Wood.

Though we cannot absolutely assign the Cause of this, we can tell the Housewife how to prevent the Damage, which is enough for Use if not for Curiosity. There needs no more to this than to skim the Cream after a shorter Time standing. We have observed before, that when Milk stands too long the Cream hardens on the Top of it, and the Butter made from such Cream is bitter; this shews that too long standing alone may be a Cause of Bitterness in the Butter, and for that Reason, where there is Danger of the same Accident from any other Cause, one would take Care to prevent this from joining to make it worse: on this Principle has been founded the Practice of skimming Milk earlier at that Season of the Year; and the Consequence has shewn that this alone will prevent the Bitterness of

of the Butter, whatever else was the Cause that would have made it so.

In DEVONSHIRE, and some other Places, they make a particular Kind of Butter, which from the Manner of ordering the Cream, is called scalded Butter. The Advantage of this is not only its being particularly well tasted, but that it will keep a Month without Damage. The Way they raise their Cream for this Purpose is the same the Chemists use when they have a Mind to give any thing a gentle Heat, without burning it to the Vessels, and which they call a Balneum Mariæ, or Water Heat.

It is done in the scalding the DEVONSHIRE Cream thus.

They strain the Milk into Vessels as is usual, and set it by for the Cream to rise. Ten Hours afterwards, when the Cream is risen in the common Way, they set the Vessel with the Cream, Milk and all, over some Water in another Vessel, so that the Water reaches half Way up that wherein the Cream is: this done they set the Vessel of Water over a Stove, and gently heat it till the Cream is thoroughly and perfectly risen, and the Milk underneath is quite thin and blue. The gradual and soft Heat does this, throwing up the whole Cream perfectly, and at the same Time doing it a great deal of Service, for the Article of keeping by the Heat.

When it is in this Condition the Cream is skimmed off with a skimming Dish full of Holes, and the blue Milk is let to run perfectly away from it.

In this Condition it is a Kind of clouted Cream, the Fire so gently conveyed to it has done it great Service; and it may be kept with proper Care several Days, so that enough of it may easily be got together for churning. All that is needful for preserving it during this Time, is shifting it once in four and twenty Hours into a fresh and perfectly clean Vessel. This is one of these Instances wherein we see the Value and Advantage of Cleanliness, but it is not particular, its good Effects are universal. As to the churning of this Cream no Difference is to be used from the common Method.

CHAP. XV.

Of churning.

THE Cream is now ready for the Churn, whether fresh or kept according to the Rules we have given for that Purpose, and we suppose the Time arrived when Convenience calls for the making of the Butter. We shall consider first the common Way of making it with the old fashioned and long used Churn. This is a Vessel of Wood, tall and deep, widest at the Bottom and narrower to the Top, where it has a Cover that falls in close, and has a Hole in its Middle. Through this Hole is let the Handle of the Instrument, wherewith the Cream is to be beat; this consists only of that Handle, and a round Board, like a broad thick Trencher at the Bottom, in Size suited to the Middle of the Churn. When this is put in, the Handle is let

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through the Hole of the Cover, and that is then put on and fastened down. This is the whole Contrivance of this familiar and useful Instrument; all that is required for making of Butter is well beating of the Cream. And it is very well done by this Instrument, for the Cream being in the Churn, the working of the Handle up and down in the Hole of the Lid naturally agitates and beats the Cream, and the fastening of the Cover prevents its rising out.

This Churn, which is the good Housewife's old Implement, is to be made clean with all possible Care, by thoroughly washing and scalding, and then exposing it to the Air to sweeten and purify. When every Part belonging to it is thus perfectly cleaned, it is to be brought into a proper Part of the Dairy, and this differs according to the Season, for which Reason there can be no particular fixed Place for its standing.

All Niceties are to be observed in churning, for it is well known to the Housewife, to be a very precarious Article; and often when all the Care possible is used, the Work goes on very vexatiously, and the Butter will not, as they express it, of a long Time come.

A moderate Temperature of the Air is the most favourable for the working of Butter; wherefore, according to the Season of the Year, this must be favoured by the Place of the Churn. In every Dairy there are some Places warmer and some cooler than others. Now in Winter the Churn must be set in the warmest Place; and in Summer on the contrary it must stand in the coolest, for the Success of the Work.

In the same Manner the Time of churning must be varied according to the Weather. In the Heat of Summer, the Weather being naturally too hot for the making of Butter, no Hours are proper but either very early in the Morning, or very late in the Evening, because then only the Air is in that temperate Way, so essential to this Business; on the other Hand, as the Air is too chill and cold in Winter, the same Caution must be used in an opposite Manner of Choice, that is, the Middle of the Day, and no other Time is to be taken; because it is at the Noon Time alone, in these Seasons, the Air is any thing like temperate.

The Hour and the Place of the Churn being fixed, the Housewife has nothing to do but to go to work. She is first to stretch a coarse, strong, and very clean Cloth across the Top of her Churn, and into this to pour the Cream. Cleanliness we have all along prescribed as the first Virtue of the Dairy, but here it is so very essential, that the Admixture of the least Particle of Dirt might prevent the whole Business, and all the Labour be done in vain. When the Cream is strained and pressed through this Cloth, the Churn is to be covered in with the whole Preparation, and the Maid is to go to work.

There is great Uncertainty as to the Time of the Butter coming, but this depends more upon the Manner of beating, than any of those fantastical Causes to which it has been assigned. Thus a heavy, tedious, dull Manner of beating gives the Cream Time to gather again between Stroke and Stroke, when it was about to break; and on the contrary, the swiftest Work does the most Business.

ness. Therefore let the Mistress first examine the Manner of working of those who complain; she will commonly find Laziness is the Devil in the Churn, that sets his Spell upon the Butter. Let her oversee the Work at first, and see it is done briskly, with swift, sharp Strokes, and tell the People, for their own Sakes, to continue it in the same Manner.

She will know by the Sound of the Strokes how the Work goes on. At first the Noise is deep, found, and heavy; but after a Time, the sooner the sharper the Strokes, it will begin to be higher and sharper. This is a Proof the Cream begins to separate from the thinner Part that yet remained with it, or as they commonly express it, that the Butter comes: the Work is now to be continued with the same Spirit and Earnestness, and the Effect will soon follow. The Staff will be perceived to work lighter; and soon after this, upon opening the Churn, and examining the Top of the Lid on the Inside, there will be found Drops sticking to it that look yellow. The Butter is now coming, and there will soon be an End of the Labour, for these Drops are absolute Butter, and when the Change is thus perfect in one Part, it will not be long before it is so throughout; after a few Strokes more let the Churn be again opened, and there will be found Butter on the Sides as well as Lid, and every where, so far as the Splashing can reach.

The Butter is now made, and is only to be got together. For this Purpose the Lid and Inside of the Churn must be scraped clean, and the Butter, which is got off from them, must be put down among the rest into the Body of the Churn; then all is to be covered up again, and the Work continued, but not with hard downright Blows, but with a Kind of slight rounding Strokes; for all that is to be done now is to get the Butter together into a Lump in the Churn, that none of it may remain in separate Pieces. When this is done the Butter is finished, and is to be taken out of the Churn.

This is the general Method; and these which we have named are the Cautions always to be observed: but having thus far explained these, we shall now enter upon those Particulars which promote or retard the Formation of the Butter in the Churn, that the Housewife being aware of what will prevent her Success, may guard against it; and knowing what will forward it, may pursue it.

The Temper of the Air we have named already, as a very great Article, and are to repeat the same here on another Occasion; for it not only may retard the coming of the Butter, but may spoil it when it is made.

Over hot Weather not only makes churning difficult, but the Butter, when it is made, is so far influenced by the Weather, unless properly guarded against, that it is whitish, brittle, and bitter; we have shewn how to avoid these Accidents, by taking an early or late Hour and a cool Place. The early Hour is better than the late, for the Air is cooler in the Morning before the Sun rises, than it can be in the Evening, after it is set, because in one Case it has been heated all the Day, and in the other it has been all the Night cool-

ing; as to the Place, the hotter the Season the cooler that must be. I have seen very fine Butter made at Noonday in August, in an Ice-house. This may serve as a Proof how possible it is to countervail any Heat of the Air, by the Coldness of the Place. Ice-houses are not in the Farmer's Power, but neither need he use the Middle of the Day for churning, a cool Cellar, or the deepest and remotest Place in his Dairy, two Hours before Sunrise in a Morning, will be equal in Coldness to the Ice-house at the Middle of the Day.

In the coldest Time of Winter it is often very difficult to make the Butter come at all; and I have seen so much of this, that I think the Experiment I saw tried in the Ice-house could not have succeeded as it did, were it not that the Cream when carried in had a great deal of Heat in it from the common Temper of the Air, and the Butter came before the extream Cold of the Place had any great Effect upon it.

Having thus laid down the general Principles, and explained the Reasons of the Difficulties which often perplex the Housewife in her churning, we shall in the next Chapter lay down a few plain, easy, and practical Rules for her Assistance.

CHAP. XVI.

Particular Rules relating to churning.

IN Summer, as the Heat of the Air is the Occasion of the Difficulty in bringing the Butter, the Housewife must take all possible Means to prevent adding to the natural Heat of her Cream, and to cool it gradually.

We have advised very brisk working of the Staff in general; but here must be a Kind of Exception; for too much Motion will occasion Heat; and therefore in extream sultry Times it will be better to manage the Blows accordingly, making every Blow smart and sure, but not repeating them so quick upon one another.

There is some Mystery and Art in churning at any Time, but it is at this that the main Difficulty occurs; and if it be not managed according to these Directions, there will be a great deal of Perplexity and Plague.

In the next Place, let the Housewife take Care that she does not add to the Heat occasioned by the Weather, by any Heat in the Churn itself; and farther let her abate the Heat when it is naturally so much that nothing can be done by cooling it.

With Respect to the first Article, as her Churn is to be scalded in order to make it perfectly clean and sweet for the Use, let her take Care that it be thoroughly cooled, before she puts her Cream into it. Scalding Water gives a great deal of Heat, and Wood keeps it a long Time: therefore let the scalding of the Churn be the first Thing done in the Preparation for the Work, and let the Churn be thoroughly examined by the Hand half an Hour at least before it is used, that it may be cool. Wood will retain Heat when the Hand does not feel it, but half an Hour's cooling, after no more is perceived, will
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set it right. To add to this in very hot Weather it will be well to wet the Outside of the Churn with Pump Water fresh pumped, a little before the putting in the Cream, but the Inside must not be wetted so near the Time.

Under these Cautions, and using the proper Hours, there is Reason to hope the Butter may come without much Difficulty; but if, after a moderate Time, there be no Appearance of it, as nothing can be reasonably supposed to be the Cause but Heat, let a Washing Tub be a third Part filled with fresh pumped Water, and brought to the Place where the Maid is churning; let the Churn be placed into this, and if the Water do not reach as high up the Outside of it as the Cream rises within, then let more be added till it does: let the Work be now carefully continued, and commonly, as soon as the Effect of the Water is felt through the Wood, the Butter will begin to come. It is not only that the Cream is thus brought to that Condition of Warmth, in which the Butter comes best, but the sudden Change is of great Assistance: the same Effect that the cold Air of the Ice-house in the before-mentioned Experiment had upon the Cream, the sudden Chillness of the Water shews in this Case; and doubtless, as a considerable Change is to be made in the Thing itself, for the Difference is really great between Butter and Cream, this quick Shock, better than any other Way, brings it about.

These then are the little Particulars by which the Housewife will be able to assist herself, in Cases when the too great Heat of the Weather prevents her Success; on the contrary, when her Difficulties are owing to too cold an Air, she must, in the same Manner, assist Nature by giving a little Warmth.

We have advised her, in the other Case, to be very careful the Churn be cool from the scalding, but in this she will do well to examine the Vessel how it cools by Degrees, and to strain in her Cream while there is yet some Warmth remains in the Churn, from the Water that cleaned it. This will give a little Help to the Cream; and the Maid must be ordered to work it more briskly than ordinary; indeed the Coldness of the Weather usually puts her in Mind of this, and the less Admonition is needful.

If with this Assistance the Butter do not come, let the Churn be taken into the Kitchen, and placed not within the Reach of the Fire directly, but in the Air of it, this will by Degrees bring the Cream to the due Temper. Then the Work of churning is to be continued briskly, and it will not be long before there come good Butter.

There is generally more Trouble in getting Butter in very cold Weather, than at any other Time, but by these little Assistances it will be greatly alleviated; and there is nothing in all this that will be at all prejudicial to the Taste or Colour.



C H A P. XVII.

Of the washing and making up of Butter.

THE Butter being now formed in the Churn, and by the last Strokes worked together into one large Lump, is to be taken out and finished by a gentler Operation; the Strokes of the Churn would be now too harsh, it must be moulded in the Hands into a better Consistence.

It is to be understood that Butter, when thus made in the Churn, is far from its Perfection. It is separated from the watery Part in some Degree, but not entirely. The whole Operation depends upon this, that as in Milk there was a richer Part and a poorer, which being separated by standing, the richer Part swims at the Top, and is Cream; so in the Cream itself there are two separate Substances, an oily, which is properly the Butter, and a watery, which is the Buttermilk. The separating of these is what we call making of Butter.

This Separation is performed by agitating of Cream in a due Degree of Heat, and this being done perfectly the Butter is perfectly made. Now the Churn does this but imperfectly, being a clumsy and unweildy Instrument; but it makes a good Beginning, and the Hand is afterwards very well able to finish it.

This finishing consists in two Articles, the perfectly separating the Buttermilk, or thin Part, and the cleansing the Butter from any accidental Foulnesses that may have got into it, for this is always possible; and it is to be done in this Manner.

The Lump of Butter in the Churn is to be taken up with both Hands, and removed out of the Liquor. In this there comes a Consideration, which is only to be determined by the Time the Butter is intended to be kept: if that be short, that is, if it be made for immediate Use it is to be thrown into Water immediately, on taking it out of the Churn, if otherwise not.

Therefore whichever be the Case, let a very clean Pan of Earthen Ware glazed, be set ready by the Churn, and if the Butter be designed for Use immediately, let this be half full of clean fresh Water; if not let it be empty.

The Lump of Butter being lifted out of the Churn must be put into this Pan, and there worked thoroughly to and fro in the Water, or without, labouring it with both Hands, and moving it frequently about; by this Means the Buttermilk that remained in it after the churning will be thoroughly washed out, and the Butter will be pure and of a firm and good Consistence: the well working, turning, and tossing the Lump at this Time of the Operation is a very material Article, for to that alone the Butter owes its Purity, its good Consistence, and in a great Measure its Colour, at many Times of the Year. I have seen Butter that looked white and chalky, on taking out of the Churn get a very good pale Straw Colour, in the frequent and repeated working in the Hands among Water.

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The Buttermilk being thus perfectly separated, one of the two Points intended by the working in the finishing of it up, is obtained; the other is the perfectly cleaning of it.

So much Care as we have advised, one would think, would keep out Dirt from the Butter, but it does not always happen; for a Rag of the straining Cloth, a Hair, or some other Impurity, may escape the Observation; and any thing, the least imaginable in this Kind, may damage the Butter in the Respect of Sale, and will always be a Blemish in the good Housewife's Character.

The working the Lump in the Hands may discover some Foulness of this Kind, which must be picked out as soon as seen; but lest any should have escaped the Eye, the whole must now be taken out of the Water, and cut cross and cross many Times with a Knife, till every Part of it have had the Knife in it, this will find out any little Thread or Hair; and thus it is to be made entirely clean.

The last Thing to be done is the salting. We are not here speaking of the salting that is to prepare Butter for long keeping, but just of that which is done to give it a Relish. Butter is very insipid when it is made up entirely without Salt, so that the freshest should always have some. It is to be worked into it in this Manner. The Butter that has been cut and cleaned is to be spread out thin with the Hand, in the Bottom of a broad shallow Dish; and then a very little Salt is to be sprinkled carefully over it, the Design being to mix it as equally as possible in the whole Quantity; it is then to be worked up well in the Hands, and is done: it may be wrought up into Rolls, Lumps, or Dishes, or formed in any Shape most saleable at Market, or most convenient in the Family. Having thus gone thro' the whole Work of making Butter, and making it up fresh, we shall proceed to the salting of it, that being a very essential Part in the Farmer's Traffick in some Places. But here, as we have named only the plain good old Family Way of churning, it may not be amiss to observe that there are others which have their Use.

The Sweep is a Kind of Churn which works in the Manner of a Pump, and is used with a great deal of Ease and Advantage in many Places: in other Parts of ENGLAND they prefer the Barrel Churn, and it also answers very well; these Instruments are to be had at the Turners, therefore I shall say no more of them here, as I shall not take upon me to recommend them, though I allow they are good in their Kinds; the other always, so far as I have seen, very well answering its Purpose.

The greatest Preference that is made for using these, is the Quantity they can manage, and the Expedition of the Work ; but I have seen twenty Gallons of Cream wrought at once in a common Churn, big enough to hold thirty ; and this Quantity brought to Butter in about an Hour. When the Quantity is so large a Woman alone is not able to manage it, but a Man and Maid do it perfectly well.

In hot Weather Butter, though very well made, will sometimes continue too soft, and this will be a great Disadvantage in Respect of the Carriage to Market, and sometimes hurts the Sale.

In this Case, as the Cause is known, the Remedy is easy. Too much Heat being the Occasion, a little additional Cold will set all to rights. This may be done with great Ease by the Help of a Well, which is a Convenience few Farms want. Let the Butter, when it is thoroughly made, and properly salted, be rolled into Lump Pounds, or half Pounds, according to the Demand there is expected for those several Sizes, and put carefully into a Basket: let a long Rope be fastened to the Handle of this Basket, and let it be let down into the Well till it come within two Foot of the Water. In this Way let it hang all Night, taking Care no Accident happen to it by Thieves or Carelessness of Servants, and in the Morning let it be drawn up and sent to Market. The cold Air that lies just above the Water in the Well, will have the same Effect as the natural Cold of Winter, and it will be as hard as Butter commonly is in NOVEMBER.

With Respect to the salting of fresh Butter, the particular Fancy, and Taste, and Custom of the Country, are to be so far considered, that it is very difficult to establish any general Rule; but in a moderate Way we may say, that a Pint of Salt will serve for twenty Pounds of Butter; some go as far as a Pint and half for that Quantity, but 'tis too much, for only the Flavour of the Salt is wanted, to take off the Insipidity of the Butter: therefore the least that will do is best; but those who go much under a Pint to twenty Pounds do not answer their Purpose, for the Salt is not so much as tasted when so little.



C H A P. XVIII.

Of the making of Butter from new Milk.

AMONG the Improvements that have been made in Husbandry of late Ages, this may be very justly reckoned one, for in large Concerns it shortens the Trouble of a Dairy very much. As we have given the Rationale of Butter making in the preceding Chapter, there will not appear any thing strange or wonderful in the Attempt, or in the Success of making Butter without the Trouble of first setting the Milk for Cream.

It has been seen that when Milk stands an oily Part separates, mixed with some Water, this is Cream, which consists of Butter the oily Part, and Buttermilk the watery. This is afterwards beat, that by Means of the Motion the remaining watery Part may be separated from the pure and oily.

Now it is plain that this oily Part, which is wanted for Butter, is originally in the Milk; and there is no Reason to wonder that beating, which in the common Way of working, drives out the watery Part, and separates the oily from the Cream, may in a greater Degree, separate this oily Part at once from the Milk.

This is the Principle upon which they proceeded, who first set up the Scheme of new Milk Butter, and it answered accordingly.

It is for this Use that Machines, and other Contrivances, are to be called in to the Assistance of the Farmer, the Quantity of Milk not reduced

duced to Cream being too great for the good old Implement the Churn; and the Labour required for separating this oily or buttery Part from it, is so much greater than is needful for Cream, that no human Creature could be well expected to go through it. Therefore it has been properly contrived for this Purpose, that the Vessels shall be very large, and easily put into a violent Motion, and that the Work shall be performed by a Horse.

In some Places they contrive to use an Implement not unlike a common Churn for this Work, but it does not do near so well as those Barrels that run round, with Stops in them for that Purpose.

The Farmer who has a Mind to fall into this Way, will easily get the Machine, the Structure of it being sufficiently understood among the Mechanicks in most Parts of ENGLAND; but he may, by fresh Contrivances, save himself a great deal of Labour and Trouble: he may contrive his milking Place in such a Manner, that the Milk may come directly from the Cow, through a Pipe, into the Vessel; which, when the milking is over may be set in Motion, and at once make the Butter.

As we have named the Benefit of this Method, which is for the managing a great Quantity of Milk with little Trouble; it will be proper we fairly set before the Farmer also its Inconveniences. The principal of these is, that the Butter made this Way, though very good for present Use, is not found to keep so well as that made in the common Method.

The Buttermilk that is made this Way supplies a tolerable Kind of Cheese with little Trouble: they let it out into other Vessels, and then add Runnet, and it comes to a Curd very readily.

Having thus gone through the Articles that naturally fell in the Way, before we come to the salting of Butter, we shall proceed to treat of that important Article in a plain and practical Manner.

C H A P. XIX.

Of salting of Butter.

IT is often necessary, and always profitable to salt Butter at certain Seasons; but there are Times of the Year more proper than others. In general, the Butter of the early Part of Summer is not so proper for salting; and that of no Time is so good as what is made from the Middle of August to the latter End of October.

The first Difference that is to be observed in the making, is when it is taken out of the Churn. We have ordered fresh Butter, that is, such as is intended to be kept fresh, to be put into a Pan of Water, and there worked with the Hands to get out the Buttermilk; but in the Butter intended for salting no Water must be used to this Purpose. 'Tis to be put out of the Churn into an empty Pan, and there worked between the Hands, to squeeze out the Remainder of the watery Part.

This done the Butter is to be mixed with Salt,
N^o 48.

which is to be worked in with the Hands, the more the better, the Way is to spread out the Butter as in mixing that small Quantity of Salt with such as is intended for immediate Use; but instead of that small Portion, as much as can be got in is to be added here, and when the whole is well mixed, the Butter thus prepared is to be put up in Pots or Barrels: for large Quantities Barrels are needful, but for lesser Quantities Pots are more proper; but they must be well glazed, otherwise the Brine will eat into them. In Pots it is proper to lay in a thin Bed of Salt before the Butter is put in, and when it is put up then to lay another Bed of Salt over the Top of it.

In many Places where they barrel up large Quantities, they also pierce Holes through with a Stick, quite from the Top to the Bottom of the Barrel, and making a very strong Brine, they pour in a Quantity of it over the Butter, and let it run down all these Holes, which is of great Service in preserving the whole.

Some, instead of a Bed of Salt upon the Butter when they have potted it, pour over it a Quantity of strong Brine, and this is no bad Method.

As for the keeping, which is the great Purpose for which Salt Butter is designed, though it must not be washed when taken out of the Churn, yet a great deal depends upon the getting the Whey well out, which can only be done by thorough working it in the Hands; and this is the more material, because otherwise it would dissolve and carry away a great Part of that Salt that was used in preparing it, so that it would fail.

As to the Quantity of Butter reasonably to be expected in proportion to the Number of Cows, Accidents will make a great Difference; but in the Butter Countries they generally account that they may, one Year with another, expect from ten Cows a Firkin and half of Butter in a Week, in Summer; and from the same Number a Firkin in Winter. The Difference of feeding makes a great Variation in the Goodness of the Butter, and none is worse than such as is made when the Food is between wet and dry, as is the Case in the Beginning of Spring and latter End of Autumn, the Food being at those Times between Grass and Hay, and that Irregularity having a great Effect to the Disadvantage of the Milk.

There are two Ways of making Salt Butter fresh, when there is Occasion for it; and it is possible, by salting up the Butter in the cheap Times, and freshening it when dearer, to make some Advantage.

The Method for the Service of a Family is by beating it up with new Milk; but when it is done by Way of Advantage; and for the Market, the Way is to cut it into thin Slices, and put it into the Churn where Cream is beating for fresh Butter. A good Quantity may be added in this Manner, but there is an Art in just hitting the Time. It must be put in when the other Butter begins to come, otherwise it will pervert and disturb the Operation; but in this Manner it goes on very well with the rest, and if not too long kept will, on being washed with the rest, pass with it as very good fresh Butter, not at all debasing the Price.



C H A P. XX.

Of Whey Butter.

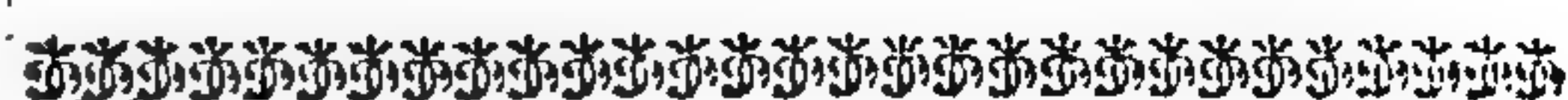
WHEY Butter is a Thing little known in LONDON, but 'tis often made in the Country, for the Service of Farmers Families. It is like other Butter, but poorer and rank; and made from a Cream got out of Whey, as the other is from the Cream of new Milk. We have shewn how a Kind of ordinary Cheese is made from the Buttermilk, when new Milk is churned for Butter instead of Cream; and in the same Manner in this Instance, a poor Kind of Butter is made from the Whey of Curds made from new Milk.

All this depends upon one and the same Principle, which that all the succeeding Part might be naturally understood, we laid down in the Account of Milk. This is that there are in it three distinct Substances, an oily, a curdy, and a watery Part; now by whatever Method any one of the two first is separated, the other will always, more or less, remain in the watery Part that is left. This is the whole Matter. When new Milk is wrought at once for the Butter, the curdy Part is left behind, and the Addition of Rennet to the Remainder makes a Kind of Cheese; and just so when Rennet is at first added to new Milk, the curdy Part only is separated, the oily Part remaining, in some Degree, in the Whey; and this oily Part being separated from the Whey makes the poor Kind of Butter, thence called Whey Butter.

The Method of making it is thus. When Curds have been made from new Milk, the Whey which is drained off is to be set in large Pans, or other broad and shallow Vessels, and placed in a quiet Part of the Dairy, just as new Milk would be for Cream; there will rise a Cream upon this, though not like that from new Milk, and it is to be skimmed off and churned in the same Manner.

The Butter this yields, we have observed, is very poor, but in some Places they enrich it, by adding a fourth Part of new Milk Cream to the Whey Cream; these, in any Proportion, mix very well together, and the Butter is the better according as the more of the new Milk Cream is used; that bringing it so much nearer the Nature of the other.

Beside the inferior Quality of the Whey Butter, its Quantity in proportion to the Cream, is but poor. The same Measure of Whey Cream yielding but about half as much Butter as the other: neither will the Whey Butter ever come to a good Consistence, nor will it keep; so that at the best it is but a very poor Matter: however, it may be worth the Farmer's while, in most Cases, to make it.



C H A P. XXI.

A Method of taking off the ill Taste of Milk.

WE have observed that however uncertain we may remain, as to the Cause of the ill Taste Milk has at certain Times, yet the Effect is constant, and is very prejudicial to the Farmer; the Taste being communicated from the Cream to the Butter, and reducing its Price and Estimation. To the Methods we have laid down for the preventing and remedying of this Evil, we shall here add a new and very particular one, the Invention of Doctor HALES, an Author not more distinguished by his Genius, than by the constant Application of it for the Publick Good.

We have occasioned the Method proposed by the Gentleman, to be tried, and have found it answer so well that we shall not scruple to assure the Farmer, it is not more singular than successful. The Instrument to be employed for this Purpose is very easily made and of small Expence, and the Use of it very familiar. We shall therefore advise every Farmer to have one of them, and never to fail of using it when he perceives his Milk to be ill-tasted, from whatever Cause that may arise.

The whole is no more than this. A round Tin Box is to be made, of six Inches Diameter, and two Inches in Depth: the Lid of this Box is to be pierced full of Holes, they should be about a quarter of an Inch distant from one another, and a twentieth of an Inch in Diameter. A Tin Pipe or Nozzel is to be soldered into the Middle of the Lid, and to rise to some Height above the Surface, so as to receive securely the End of a long Tin Pipe, through which the Air is to be conveyed into the Box; through the Holes of which it is to be blown up again through the Milk; this Tin Box being placed at the Bottom of the Vessel.

The Tin Pipe that goes into this Nozzle is to be a little more than half an Inch in Diameter, and two Foot or more in Length, according to the Depth of the Vessel.

To the Top of this strait Pipe is to be jointed and soldered on another at right Angles. This should be of the same Bigness with the other, but it need not be more than six Inches in Length.

To the End of this that is free, a Leather Nozzle or short Pipe is to be fixed, and then the whole is completed.

The Cover or Lid is best made deeper than the Box, and scallop'd in the Part that goes in; this lets the Air Holes have free Passage, and there is to be a Row of them on the upper Edge, where it is not received into the Box.

Every Tinman will be able to make this Instrument, and the most ignorant Servant may be instructed to use it: the Principle whereon its Benefit depends is this. The ill Taste of Milk is so lightly mixed with it, that it may in a great Part be carried off, by blowing a Quantity of Air in dispersed Particles through it; and this

this is to be done very conveniently by the Instrument now described.

The Tin Box is to be placed in the Middle of a large Vessel, into which the Milk is to be poured as it comes from the Cow. The Tin Pipe is to be put into the Nozzle prepared for it, and when this is well fixed the Milk is to be poured in. Then, the Box being kept firmly at the Bottom, the Nose of a Pair of common Bellows is to be put into the Leather Nozzle at the Top, and a Person is to blow for some Time.

The free Air is thus taken in by the Holes at the Back of the Bellows, it is forced down the Pipe by the Strength of the Blast, and it rises through all the Air Holes in the Box, and thus passes in so many small Streams up through the Milk.

When the Milk is but slightly ill tasted, it is thus to be poured into the Vessel, as it comes from the Cow, and about forty Minutes blowing will perfectly sweeten it; but when it is very rank the best Method is to make it scalding hot, and then pouring it in, to continue blowing till the bad Taste is perfectly gone.

This Method, under proper Management, will make, at any Season, perfectly fine Butter out of ill tasted Milk. In this last Case a great deal of Care must be taken not to burn the Milk to the Vessel in heating; and it should be kept warm during all the Time of the blowing.

The Author of the Experiment tried it upon the Milk of a Cow fed with Cabbage Leaves for eight and forty Hours; and though the Milk was very ill tasted in itself, it became perfectly sweet in ten Minutes blowing. This was an Experiment with only a Gallon of the Milk, and it was kept hot by being set in hot Water during the blowing. The Cream produced by this had not the least ill Taste.

Some Caution must be used in blowing into large Quantities of Milk, because of the Abundance of Froth that will rise. If the blowing be too violent, this will swell over the Top of the Vessel, therefore it is to be managed gently. The blowing must not be so brisk but that a Person standing by may break the Bubbles, and keep the whole within Bounds; it will take somewhat the more Time the slower the blowing is performed, but the Business will be done as effectually.

But though the blowing may be performed more gently or more forcibly, and the Effect be the same in the End, the Heat of the Milk must be carefully observed, for otherwise, when the ill Taste is considerably great no Art will get it away.

The Experiment Dr. HALES tried, by feeding the Cow on Cabbage Leaves, was a very fair one for this Purpose; for excepting Crow Garlick, which the Creatures sometimes eat in the Fields, there is nothing that gives the Milk so lasting an ill Taste. A Cow's Milk will be made rank by Cabbage Leaves a Week after the Time of her eating them.

Crow Garlick gives so strong a Flavour to the Milk, that no blowing will take it perfectly off when it is cold, though it abates it sensibly; but if the whole be kept warm for some Time, and well blowed, the Scent and Taste will be carried entirely away.

When Milk is to be blowed in this Manner, for the taking away its ill Taste, it will be proper to mix a little Water with it first. This Water should be cold in Summer, if the Milk be blowed cold; and warm in Winter: but if the Milk be heated in order to the perfect curing it by blowing, then the Water should be put to it warm.

It is found by Experience that the Cream separates better from Milk for the Addition of a little Water in the common Way of Management; for it thins the whole, and by that Means the Cream more easily disentangles and separates itself. In the Method of blowing it answers a double Purpose, it renders the whole Body of the Milk thinner, so that the Air passes more thoroughly and freely between its Parts, and the Surface is less frothy; so that the blowing may be brisker, and therefore the Operation shorter, and the Cream always rises after this in a very free and perfect Manner.

There is one very peculiar ill Taste that Milk has, and consequently the Cream rising from it, and the Butter made from that: this is a dead offensive Flavour, worse by much than any of the rank Tastes named already: it rises from the Cow's drinking stagnating, foul, and stinking Water. The Farmer should, by all Means, prevent it, for it not only hurts the Credit of his Dairy, but endangers the Health of his Cattle; on this we shall treat farther in its proper Place, when we come to consider the Disorders of Cattle, their Causes and their Remedies; what concerns us here to observe is, that the ill Taste may be got rid of by this Method of blowing Air through the Milk: but it requires the whole to be kept warm, and the blowing to be continued some Time.

All the ill Tastes that happen to come into Cream are first in the Milk, and the best Way of attempting to remove them is always in the State of Milk, before the Cream is separated.

In some of our Counties, when they perceive their Cream to be ill tasted, they heat it scalding hot, stirring it all the Time it is heating, and also till it cools again; and in other Places they heat the Milk for this Purpose before it is set for the Cream. Both these have a good Effect; but probably the heating of the Milk, when properly managed, will be found the best Method.

With respect to the curing the ill Taste, by this Method of blowing, it must always be done to the Milk, not the Cream, for many Reasons. It is more conveniently performed in the thin Body of the Milk, than in the thick Substance of the Cream: the thick Body of the Cream sends up a Froth in the blowing, which is quite unmanageable: and what is much more essential, the Matter which causes the ill Taste is much more difficultly removed in the Condition of Cream.

We have observed that the Addition of Water to the Milk assists and shortens this Operation, by thinning the Body of it; and from the same Reasoning it must be more tedious, as well as more difficult, to get it out in the State of thick Cream; and so it is found upon Trial.

These are the Reasonings and Observations of

of that excellent Philosopher, confirmed and extended by some few Trials; the Success of which seems to promise, that there will be great Advantage to the Dairy, in bringing this new Practice into general Use. We are sensible it will seem strange to the Country People at first; but a fair Trial will recommend it to them, and it will soon be universal.

C H A P. XXII.

Of the Use of the Barrel Churn.

TO this general Account of the making of Butter, we shall join for the Sake of those who like Improvements, the Manner of using the Barrel Churn: how far it is to be esteemed we have said already, but when it shall be introduced into any Dairy there requires a particular Management of it; and without the Knowledge of that the Farmer may never come at its real Advantages.

The best Way of making Butter with this, is out of Cream got in the usual, careful, and cleanly Way, as we have described it before.

This is to be strained into the Barrel Churn, as into the other, and the Advantage is, that turning upon a Spindle the Motion of this Churn, if well managed, is more regular than that of the other. But at the same Time we are to tell the Housewife, that there requires a great deal more Skill in the Use of it.

The greatest Mistake I have been used to see made with this Churn, is the turning it about too quick. This is a very natural Error; for those who know the Value of quick Strokes in the other, naturally fancy the quicker the Motion here the better; but the contrary is true, for I have seen Butter made and unmade again many Times over, by working it in this Manner.

On the contrary the right Rule is, that the Turning be gentle, slow, and steady; for this soft Motion on the Spindle is equal to a very sharp beating in the downright Way. When this turning is done in the right, even, and easy Manner, the Butter comes quick, and comes very pure and fine.

It is naturally hard, sweet tasted, and will keep; whereas the single Article of too violent turning will make the very same Cream, in the same Churn, yield a soft, bitter Butter, that will not keep. One Thing farther must be observed, which is, that this gentle Motion must be kept up without Interruption, from the first Turn till the Butter comes, for all goes backward upon stopping. When the Motion has been too brisk, and the Butter is near made by it, I have seen, that on stopping a Minute only, the Cream and Buttermilk have mixed again almost as entirely as before, and the whole Work was to have been done over again, little otherwise than as if the Cream were then put fresh into the Churn.

We have told the Housewife she is to see the Barrel Churn turned constantly, without ceasing, till the Butter comes: she needs not to open it to examine into this, for she will know by the Sound: there is a particular squashing Noise in the Churn

when the Butter is come, which is quite different from what the Cream made in it before: when this is heard she may be as sure the Butter is made as if she could see it; and then she is not to order the Servant to stop, but only to turn more softly and gently than before. This serves to finish the Separation of the oily or buttery Parts, and to bring them together into a Lump or Mass: this must be continued half an Hour, and by that Time all will be perfectly done.

The Butter is then to be taken out of the Churn, and well worked with the Hand; and the Salt mixed with it according to the Intention of spending it fresh, or keeping.

In this and all other salting of Butter, it is a good Method to have the Salt beat to Powder: some have used Basket Salt, because of its Fineness, but it is dear and has little Taste, in Comparison of the other. Every Housewife knows how to powder common Salt, by first drying it, and this is the best for the Use of salting of Butter.

In churning by the Barrel Churn all the same Cautions are to be used as in the other Way, respecting the Season of the Year and Condition of the Vessels. The Churn of this Shape must be kept as carefully and perfectly clean as the other: in Summer it must be well cooled from the scalding, or occasionally fresh cooled, just before the putting in the Cream, with cold Pump Water; and in Winter it should be left warm from the scalding. In these and all other Respects, the Difference only is in the Manner of giving the Motion to the Cream; and the whole Procedure, from the straining in of the Cream to the working up of the Butter, is to have no Difference.

C H A P. XXIII.

Of Cheese.

CCHEESE is the Article next in Consideration to Butter, when we are treating of the artificial Products of the Farmer's Stock; it is made, as we have shewn in general before, of the curdy Part of Milk, as Butter is of the oily; and according to the Condition of the Milk, and other Circumstances, it becomes of various Kinds, Tastes, Qualities, and Prices.

All Cheese is the curdy Part of Milk, separated from the Whey: but in some Kinds it is only the curdy Part, without the oily or buttery; and in others it is the whole mixed together, only the Whey being separated: there are also Kinds of Cheese that have different Proportions in this Mixture. In general, as it is the curdy Part of Milk that gives the Consistence and Form to Cheese, so it is the creamy or buttery Part mixed therewith, that gives it the Melowness and Richness.

The Farmer's Servants well know what Cheese that is which is made of new Milk Whey, whence all the Butter has been taken; and the Cheese of PARMA, and other of the ITALIAN Dairies, shews us how excellent a Production it may be when the whole of a rich Cream is mixed among the curdy Part in the working.

We

We have some Counties in ENGLAND remarkable for the good Cheese they produce, and others for the bad: this has by some been laid entirely upon natural Faults, as the Soil and Grass; but it is in a greater Measure owing to the different Conduct in the Dairies of those several Places. We shall shew in the succeeding Chapters, that a good Housewife will make good Cheese any where. We do not mean by this that the Milk produced by the worst Food, will yield as good Cheese as that produced by the best, the Folly of such an Assertion would be obvious to every one; but what we would have the Housewife understand is this, that when the Food is the sweetest, richest, and best in the World, a bad Manager may make bad Cheese out of the Milk; and on the contrary, that one who understands how to make the best of indifferent Advantages, will make good Cheese upon poor Land.

There are two Ways in which Cheese is naturally spoiled by the Pasturage of the Cattle: the one is when the Food is so poor that it impoverishes the Milk, so that its curdy Part has neither the true Strength nor natural Flavour: and the other is when Weeds grow in Abundance among it, which give it an ill Flavour, the Principal of these are Melilot and Garlick. As to these the Remedy is easy, for they may be pulled up: as to the other there is no Way of mending it, unless the Farmer have got better Pastures, into which he can put them; if not he must be content with indifferent Cheese.

It will then become the proper Consideration, whether he shall engage in the Cheese Way at all: and this he must learn by Trial of the Milk, to the two different Purposes of Butter and Cheese.

Although we cannot enter into the Secrets of Nature, so far as to penetrate Causes always, we have at all Times our Eyes open to Effects: these are so many Principles on which to found our Reasonings, or what is better our Conduct; and these will be sufficient for the Farmer's Purpose.

There are Pastures that yield a Milk fit for Butter, but not for Cheese, and others that yield such as is excellent for some Kinds of Cheese, but unfit for Butter. Therefore when the Farmer first sets himself down upon his Land, he is to consider first, which is the most profitable Manner of employing his Dairy in his Situation: if the Pasturage be equally proper for either Commodity, then let him principally turn his Thoughts to the making that which is most marketable; but if it will only serve well for one, let him take that, which ever it is; for Cheese and Butter are Things for which there will always be a Demand every where, although not equally in all Places.

Now when the Farmer shall find that his Land does not yield a Milk that gives good Cheese, let him try it for Butter: if it yields that good in its Kind, and plentiful, let him fall upon that Branch: but if it be really poor, and will yield neither well, then let him take the most saleable Article, which we suppose to be Cheese, in the present Case, and make the best he can of his Milk that Way. If he cannot make such as is

of a superior Kind, a worse Sort will still fetch a Price; and we have told him how much may be done by good Husbandry, even out of the worst Materials.

Let him examine what is the Cause of his Cheese being bad, and remedy it as well as he can; if not at once yet by Degrees, and that according to the Nature of the Fault. The first Thing he is to do is to get the worst Weeds out of his Pastures; and then let him, by the several Means we have laid down in the former Parts of this Work for improving of his Land, set about the Work of amending in earnest. A little Expence will go a great Way in the Improvement of Pasture Grounds, if laid out with Discretion; and he will have the Satisfaction of every Day receiving more and more the Fruits of his Care and Expence in his Produce.

Having thus prepared the Farmer for getting over the greatest Difficulties he can meet with in the Cheese Manufacture, we shall lead him to the Practice; and shall begin by explaining to him the Nature, and directing the proper Management of the Article he uses for curdling his Milk, this is what is commonly called the Rennet, or Rennet Bag.

CHAP. XXIV.

Of Rennet or the Rennet Bag.

CHEESE, we have told the Farmer, is the curdy Part of Milk separated from the rest, at least from the watery Matter, in which it is originally mixed in the natural State: the first Thing to be considered therefore is, how to get this Curd separated. It is a Property of Milk that it will curdle with any Acid whatsoever: this curdling is the Separation whereof we speak, it is the gathering together of the curdy or cheesy Part separate from the Whey.

As any Acid or sour Matter whatsoever will answer this Purpose, the Farmer has his Choice of a great Variety, but finding nothing agree so well, in all Respects, with the Milk as Rennet, that is the only one he uses. This is a very natural Preference, for most of the other Acids or sour Liquors are either of mineral or vegetable Origin: of the first Sort are Spirit of Vitriol and the like, and of the latter Juice of Lemons and Vinegar; now Rennet being an Animal Acid naturally agrees better with an Animal Fluid, such as Milk, than one of so different an Origin as any of the before-mentioned.

There is in the Stomachs of all Animals an Acid or sour Juice: Nature has given them this to assist in the Digestion of their Food, and it is in various Degrees in different Animals; and in the same Animal also, at different Periods of its Life, according to its Degree of Health.

Of all these Acids of the Stomach of various Animals, there is none so gentle and so certain of always having an equal Degree of Strength as that of a sucking Calf. This therefore is what the Farmer prefers to all others, and is what he calls his Rennet or Rennet Bag.

That he may always have it in Perfection, we shall tell him what is its proper Condition. The Rennet

Rennet Bag is properly the Stomach Bag of a young sucking Calf, that never tasted any other Food but Milk, and where the Curd lies undigested.

In the Spring Season let the Farmer recollect the Occasion he shall have for these Bags, and get himself a sufficient Store of them. And he must order and prepare them in this Manner.

First let him open the Bag, and pour out the Curd and thick Substance into a Bason, leaving the rest that is not curdled in the Bag.

Then let the Curd in the Bason be carefully examined and picked clean. There may be Specks of Dirt, Hair, or other Foulnesses among it; these must be all taken out, and the Curd is then to be washed in cold Water several Times. By this Means it will become perfectly clean and white. When thus cleaned it must be laid on a clean Cloth to drain, and then put into a clean Dish; in this it is to be sprinkled well over with Salt, using a Handful or more to this Purpose, and with the Hand rubbing well in the Salt to every Part of the Curd.

When the Curd is in this Condition let it be covered from Dust, and let the Bag be cleaned. This is to be done by washing it several Times over in cold Water. When it is perfectly clean let it be rubbed well with Salt, and then put in the Curd, which has been so well cleaned, with the Salt among it. Finally let the Outside of the Bag be also well rubbed over with Salt.

There is a great deal of Nicety and Care to be used in this Preparation of the Rennet Bag, for on that depends its Value.

When a sufficient Number are thus got ready, let them be all laid together in a Pot, and the Pot tied down carefully. Now the whole Work is done, except what is to be the Effect of Time. These Bags will keep without any Danger of spoiling, and they are in their full Perfection a Year after the preparing them.

This is the right Preparation of Rennet, and a most surprising Thing it is that all this washing and cleaning cannot remove or get out the Acid of the Stomach from the Curd, but that it perfectly answers the Purpose of curdling the rest of the Milk, whenever the Farmer pleases; and that, in a Manner greatly preferable to any other that can be named.

Though the Rennet is best after a Year's keeping, it may be used fresh and new; but the Effect is not so good. The Curd gets its right Condition from the very Time of its being separated by the Rennet; and a Fault at this Time is not to be remedied afterwards. When the Rennet is fresh, the Curd is not made so firm and strong; and the Cheese never gets a good, firm, and even Consistence; therefore it is better the Farmer purchase such as are of a right Age, than use his own too soon.

The old Way of managing the Rennet Bag was, after a very slight cleaning, to hang it up to be sinoak-dry'd in a Chimney-corner; but that is by no Means so good a Way as the salting and potting a Number of them together: it is neither so cleanly, nor does it keep the Rennet in the needful Degree of Strength.

We have shewn the Farmer the proper Way

of preserving his Rennet Bag, but there yet remains an Article very well worthy his strict Notice and Attention; that is the seasoning of it. This is to be done in the following Manner.

When the Bags have been kept a Year, let one of them be taken out of the Pot and opened. Let the Curd be emptied out into a very clean Marble Mortar, and have its wooden Pestle also thoroughly and nicely clean: rub and grind it well by itself first; and then add to it the Yolks of three new laid Eggs, and half a Pint of fine rich and perfectly sweet Cream; rub and grind these together, and when they are well mixed, dry before the Fire one Blade of Mace, one Clove, and about eight Grains of Saffron: when these are so dry that they will rub to Pieces, powder them in a small Mortar and throw the Powder to the other Ingredients; then work all well together again, till it is so perfectly mixed as to appear but one Substance. When the whole is thus thoroughly blended let it be put up in the Bag again.

Then make a very strong Brine of Salt and Water, by boiling them together; let this stand to settle, and strain off the clear Liquor into a clean earthen Pan. Take about half a Gill of the Curd out of the Bag, and mix it with this Brine. This done close up the Bag again, and hang it up with the Brine, putting in four or five Walnut Leaves.

The Rennet being thus perfectly prepared, is to be set by for a Fortnight, and will then be fit for Use.

We have here set down at large the Management of one Bag; and according to this the Farmer must dress all the rest; and his Care must be to do them one after another, in such Time as he shall want them; so that he may always have one under another, and may never be obliged to use any one that is not duly prepared, and that is not a full Fortnight old in the Brine.

Some use less Care than this in the preparing of their Rennet, but it is sparing Trouble in a very wrong Article; for not only the Rennet is sharper, and goes farther this Way than any other, but the very Goodness of the Cheese depends, in a great Measure, upon it.

Some on the contrary use more Care and Caution: thus it is not unusual to add more Articles in the seasoning: and others boil a handful of white Saxifrage, or some other Herb, in the Brine: there is little Harm in these Things, but they are needless. We are for delivering fully every necessary Article, and caution the Farmer strictly and exactly to observe them all; but we would not load him with unnecessary Trouble.

This is the needful Preparation for the making of Cheese in general, and we shall now proceed to the applying it to the several Kinds, according to the most successful Manner of making them in those Places which have been famous for them; and whence many of the Kinds are named, beginning with that Cheese which is, in a Manner, universal; and which is, when well made, very good every where.

C H A P. XXV.

Of new Milk Cheese.

NEW Milk Cheese, otherwise called Morning Milk Cheese, is a Kind of general Production of the Dairy, like fresh Butter. 'Tis made almost every where, and in most Places is very fine; but it must differ according to what we have said before of the Consequences of the Variation of Pasture; this, however, though it encreases or debases its Value, makes no Alteration in the Manner of preparing it, which is to be thus done.

In the Morning, toward the Time of the People's coming in with their Milk, let a clean and large Tub be set ready; and let the Milk brought in the Evening before, be very carefully skimmed.

Let the new Milk, warm as it is from the Cows, be strained through the Strainer we have before described, into this clean Tub, and then pour through the Strainer the Cream taken from the last Evening's Milk. This mixed with the new Milk will give it such a Richness, that the whole will often be equal to what is sold in London, under the Name of Cream.

This is too rich alone, and therefore it is to be a little reduced, and at the same Time prepared for turning the better by some hot Water. This is to be poured in in such a Quantity as will serve to make the whole tolerably hot, which scalds the Cream.

When this is done the Business is to get it cold a little; to this End it must be moved about with a Dish, till it is no more than luke-warm.

It will now be in a Condition to receive the Rennet.

As to the Proportion of Rennet to Milk, that differs according to the Strength of the Rennet; but as we can very well determine the Strength of such as shall be made according to the Directions, we may be sufficiently exact on this Head. The Strength of the Rennet made thus is such, that a Spoonful is a very good Proportion for three Gallons of Milk; so that if the Quantity be one and twenty Gallons, the Farmer will know he is to put in seven Spoonfuls of Rennet, and in the same Proportion he is to use it, let the Quantity be what it will.

When the Farmer has computed, from his Quantity of Milk, how much Rennet he shall want, there will require some Care in the drawing it from the Bag. He must do this steadily and evenly, without stirring the Bag. When he has got the due Quantity out he must strain it very carefully into the Milk. Let him not wonder at our recommending so much Care in this Respect, for if the least Particle of the Curd of the Rennet fall into the Milk, it will be unseen among the Curd it brings on in the whole, and then mixing up with the rest in the making of the Cheese it will taint and corrupt the Spot where it is; and every one accustomed to this Commodity, knows how dangerous it is to get a corrupt Spot, it never fails to spread and taint farther.

When the Earning or Rennet is put in, the Vessel is to be covered, and all is to stand quiet for half an Hour. This is the Time needful for the Operation of turning the Milk, that is, for collecting the curdy Part separate from the Whey: at the End of the half Hour the Cover is to be taken off, and if it be not come, that is, if the proper Separation be not made, it is not to be left longer for that Purpose, for the Expectation would be always fruitless, and the Loss of Time prejudicial; but more Rennet is to be put in. Beside the Difference of Strength in the Rennet itself, there is a very great Variety in Milk, some requiring more of the same Strength than other.

When the fresh Rennet is put in, the Vessel is to be covered up as before; and opened at Times to see the Effect. As soon as the Separation is well made, the Curd must be well tosd and worked about in the Whey. The best Method of doing this is first with a shallow Bowl, and afterwards with the Hands.

The Bowl is to be used in rummaging and tossing it to and fro in the Whey; and when this has been done sometime, it is to be wrought and moulded, and worked together between the Hands, and then pressed forcibly down to the Bottom of the Tub.

The Curd being got to the Bottom, the Whey is to be skimmed off with a shallow Dish; and while this is doing the Cheese Fat is to be got ready to receive the Curd.

The Curd is to be lifted up with the Hands and broke, and pressed down into the Fat.

When the Fat is well filled, the Cheese Board is to be laid over it, and a small Weight put upon it. In this Condition it is to be left till all the Remainder of the Whey, not separated by the working in the Hands, is pressed gently from it.

When it has done dropping let the Housewife wet a large Cheese Cloth, and lay it over the Board, and then turn the Cheese upon it. Then she is to lay the Cloth into the Fat, and put the Cheese in again. She is now, with a thin Slice, to press down the Sides every where, then turning the Cloth over it, it is to be carried to the Press, and there pressed with a good Weight.

It is to be in its present Condition half an Hour in the Press; after which it is to be turned into a dry Cloth, and then put there again.

This Practice is to be repeated again every two Hours; each Time using a fresh dry Cloth; and it is to continue in the Press till the Evening of the next Day: only the last Time it is turned, it is to be put into the Fat without any Cloth at all.

When it is, after this, taken out of the Press, it must be put into a Tub, and rubbed on both Sides with Salt. There it is to remain all Night; and next Morning it is to be rubbed again with Salt, first on one Side and then on the other, and left upon the Brine which came from the first and the succeeding Saltings. When it has lain thus three Days it is to be taken out, and laid on a Shelf to dry; and while it is drying the Housewife must continue her Care of it, wiping it once every Day perfectly clean with a dry Cloth,

and then turn it on the dry Side; this is to be done every Day, till it be perfectly dry. At first it is fit the Cheese dry somewhat quicker than afterwards, which may easily be contrived by changing the Place.

This is the whole Process that is to be followed in making the new Milk Cheese, we have been the more particular in describing it, because it will let the Reader into the general Manner of doing the rest.



CHAP. XXVI.

Of a one Meal Cheese.

THE Farmer will know we mean, by a one Meal Cheese, such as is made of the milking of one Morning or one Evening only; but the Morning is the proper Time, because the Day is then before him for the Business. The Reader unaccustomed to these Things might suppose we mean a Cheese to be eaten at one Meal; but we must keep the accustomed Terms: all we can do is to explain them.

A one Meal Cheese might properly be called a new Milk Cheese, or a Morning Milk Cheese, rather than that last described, because it is really made of new Milk only, or of the Morning Milk alone, whereas that has the Addition of the Evening's Cream; but we shall not be understood by those for whose Sake we principally write, if we do not keep to the Use of those Terms they are accustomed to hear.

The one Meal Cheese is made, we have observed already, of the Morning's Milk, and nothing more, and the Method of making it is the same with that before described, only that it is not so difficult in the first Part, because there is nothing of that Trouble of mixing the Cream, and preparing the whole for the Rennet.

When a Cheese of this Kind is intended to be made, the Housewife should tell her Milk People of it, and give them a particular Caution to be quick Home with their Pails; for the most advantageous Way is, to mix in the Rennet when the Milk is warm from the Cow: it is in this Case to be strained into a Tub, and the Rennet at once put to it in the Quantity before-mentioned. If the Milk be not warm when it is brought in, it must be set over the Fire to give it a little airing: but here a great deal of Caution is to be used, as to the Degree of Warmth: for a little Heat serves to make the Rennet take Effect, and the Curd separates the sooner for it, but on the other Hand, if the Milk be made too hot another Separation comes on, which is not intended in this Case, and this is the parting of the Cream from the Milk.

We see the Effect of heating Milk, whether in the common Way over the Fire, or in the Way for what is called scalded Butter, is always a raising of the Cream more freely and speedily: now this is not intended in Milk designed for Cheese, for we see on the other Hand, a great deal of Cream is added to the Milk in the former Method of making the new Milk Cheese.

This is named to caution the Housewife, that in following our Instructions for the Improvement of her Milk, she may not, by exceeding the Bounds, spoil all. Some Warmth is necessary for the Rennet taking its proper and timely Effect, but too much separates the Cream. We see that the Cream remains perfectly mixed in Milk as it comes from the Cow, and a less Warmth than this is sufficient for the giving Effect to the Rennet; therefore let the Housewife, whose Milk is not brought in warm enough, make it nearly as warm as when it comes from the Cow, it need not be quite so much, and while it is under this she is safe from doing any Harm.

When the Milk has been made of a proper Warmth, and the Rennet is in, 'tis to be covered up till the Curd is formed; and then the Cheese is to be made, in all Particulars, just as that before described; that being the general Method, we shall in none of the following Instances repeat it, but only refer to it, unless when any particular Circumstance requires some Variation.

Having mentioned what is called the one Meal, we must add the making of the two Meal Cheese; this is a Cheese made of two Milkings mixed together, and the common Way is to mix the Evening's and the next Morning Milkings for this Purpose.

In that Case the Cream is stirred into the Evening's Milk, and then the whole is mixed with the Morning's Milk: all this warmed a little together, till nearly as warm as the Milk when it comes from the Cow, and the Rennet is put to it, it is then to be covered up, and the whole to be managed into a Cheese as before.

There is another Sort of two Meal Cheese, which is made by mixing the Evening's Milk after it has been skimmed, with the Morning's entire, and this also is easily enough made into a Cheese, by first warming the whole over a Fire.

These Cheeses differ in Goodness according to the Quantity of Cream that is in them, and they are all, in their several Degrees, inferior to the new Milk Cheese described in the preceding Chapter. As that consisted of the Morning's Milk and Evening's Cream, it is the richest Cheese of this Kind. As to the others, the one Meal Cheese and the two Meal, are just equal in Goodness, when the Evening Milk is used with its Cream; but in this Case the Cheese is one Degree inferior to the other, as there the Cream of the Evening went to enrich the Milk of the Morning, without its own Milk. The third and poorest Kind is that made of the two Meals or Milkings, one of which has been skimmed. This reduces it toward the Condition of skim'd Milk Cheese; but however it is very superior to what is made of skim'd Milk only, because as that consists of the Curd of Milk wholly, that had lost its Cream, this is in Part composed of Curd with the Cream in the Milk, that of one Meal not having been skim'd. We shall add, for the Use of the poorer Farmer, and such as have Occasion for the most ordinary Cheese of all, the Manner of making it from Milk that has been skim'd entirely.

C H A P. XXVII.

Of skim Milk Cheese.

WE have come down gradually from the best Kind of common Cheese to this, which is the poorest and the worst. It is to be made with some Care; and indeed the Ingredient is so poor, that without more Caution than is needful when there are better Materials, there will be no making it at all.

When the Milk of two or more Meals has been skim'd for Butter, it must be poured into a Tub, and the first Thing is to taste it carefully, to find whether it begin to be sour; for on this depends the Manner of working it; if the nice and accustomed Taste of the Housewife cannot perceive any thing sour in it, she must put a Part of it into a Pot, and set it over the Fire, making it so hot that it shall be able to heat the rest thoroughly, to somewhat more than the Degree of Heat required in the preceding Directions.

In those Cases a richer Milk was used, so that there was Danger of raising and separating the Cream by too much Heat; but here there is so little that it is in less Danger of that Accident; and the Milk being poorer, is not so easily turned. It will require somewhat more Earning and more Heat for that Purpose.

This is the Method to be followed, if the Milk be perfectly sweet; but if on tasting it be found sour, or but inclined plainly to Sourness, it must not be set on the Fire, lest it should break: in this Case a small Quantity of Water is to be made thoroughly hot, and poured in to bring the whole to a due Degree of Warmth to receive the Rennet.

When the Rennet is in, the Vessel is to be covered, and after this the whole Process is to be repeated, till the Cheese is made in the same Manner as the former.

These are the several Cheeses made in common in all Places, and with which all Farmers should be acquainted; we shall now come to such as are more particular in their Kind, but most of them made to great Advantage.

C H A P. XXVIII.

Of Cheshire Cheese.

THE Soil and Pasturage in CHESHIRE, and the adjacent Parts, are very favourable for Cheese; we have observed, on entering upon this Article, that some Soils and Pastures are more, some less favourable, but none so much, at least none more than this.

To this happy Article, which they have from Nature, the CHESHIRE People add a particular Care in the making up of their Cheeses: otherwise there is not much particular in the Method, except what becomes needful from the great Size of the Cheese. We shall however lay down the whole Process, as we have obtained it

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from some of the greatest Dealers on the Spot; that the Farmer elsewhere, in the like Circumstances, may know how to set about the same Undertaking.

Cheshire Cheese is a new Milk Cheese of a very large Size, made from a Milk, which the Food of the Cows thereabouts renders particularly excellent for that Purpose. There is nothing more in the Matter, and the Way in which they make it we shall deliver presently; but first, for the particular Instruction of the Farmer, we shall acquaint him with their general Management of their Cattle.

The Time of the Year at which they make their fine Cheese, is from the Beginning of MAY to the End of SEPTEMBER: this they expect annually as the Season, and they manage their Milch Cattle accordingly.

In the Middle of APRIL they turn them out to Grass, they make Cheeses as soon as they begin this feeding, but the first are not the fine saleable Kinds, nor are brought to Market. They are coarse, poor, and ill-tasted, and are all consumed upon the Spot. The Pastures are too rank at this shooting Season of the Year, and the Consequence is, that the Cheeses made from their Milk partake of this Rankness, and they have it not only in their Taste but in their other Qualities: far from being of that regular and firm Texture, the Cheeses made afterwards have, these lose their Shape, swell and become full of Holes, so that they are neither well tasted nor well looking. Nothing can be so unlike what we commonly understand by the Name of a Cheshire Cheese, as what is made in CHESHIRE at this Time of the Year.

This may shew that the Effect really is owing to the Pasturage, in those excellent Cheeses we have from CHESHIRE; for we see, till the Pasture is come down from its own Rankness, it does not afford Milk fit for Cheese making there.

The People are so sensible they are to expect this, that they use particular Cautions always at that Season: they always boil a Part of their Milk, which they do not at other Seasons of the Year; but this does not answer their Purpose. However, as they are used to Cheese making they begin at this Season, and so long as it is bad they keep it for their own Use; nothing could inform them so well as Experience, when it becomes better; and finally, when it gets altogether fit for their Service in the great Way of their Traffick.

Some have attributed this Fault in the Cheese made early in the Year in CHESHIRE, to some particular Weeds; and Horsemint has been named as the Principal; but this is a palpable Error. Horsemint grows all the Summer, so that were it the Cause the Effect would remain. The whole Occasion is the particular Condition of the common Pasturage at that Season. This in the rest of the Year particularly favours the Cheese, but it is now too rank; and we very well know in other Instances, as well as this, the best Things may be faulty when they are in Excess.

It is not only before the right Season, but after it, that the Cheese of CHESHIRE is bad; we have named the Time of the Year at which the fine

Cheese

Cheese of this County is made, which lasts only five Months: after this Period, though the same Care and Pains be used in making it, the Cheese grows bad again, and is not marketable; at least they do not carry it to Market, lest it should hurt the Credit of the Country: but they continue making it for some time, for the Use of their own People.

The Fault of the Cheese after MICHAELMAS, is of a very different Kind from that in Spring. In the Month of APRIL it is rank, and in OCTOBER it is poor. This is the greatest Proof that can be, not only that the Excellence of the Cheese of this County is owing to the particular Nature of the Pastures, but that this Article of Food to the Cattle is the whole Matter on which the Difference that good Dairywomen find in Cheese, in the several Parts of ENGLAND, depends. There is good Cheese made in SUFFOLK, and we see there is bad in CHESHIRE: but in general it is reasonable to conclude, that the Soil of CHESHIRE affords a Pasturage particularly fit, and that of SUFFOLK particularly unfit for Cheese.

We see the Progress of the Growth of Pasturage in CHESHIRE, marked exactly by the Condition of their Cheese. During the Summer, when that Food is in its regular and perfect Richness, Cheeses made there, though in the same Manner with those in other Places, excel those of any other Part of ENGLAND; but in Spring the Herbage is too rank, and they are destroyed by their own Richness, and in Autumn it is too weak, and the Cheeses grow poor.

As the People of CHESHIRE begin Cheese making before the Pasturage comes to be good, they continue it after it is decay'd; and this with very good Reason, for they could not any Way else tell exactly when to begin, or just when to leave off. By this Conduct they do not lose a Day of the Cheese Season; and as to what they make before and after the Season of its Perfection, they have a Home Consumption.

When they are convinced there are no more of the marketable Cheeses to be made, they continue that Work only till they have made the necessary Provision for Home; then they go to making of Butter, a great deal of which they salt, and this they continue till the Cows grow dry.

After this general Account of the Nature of Cheshire Cheese, and the Occasion of its particular Goodness, we shall give the Directions for attempting it in other Places, according to the Rules which are universally followed there; for in all the Country they have but one and the same Practice, and they very seldom fail in their Expectation, during the favourable Time of the Year.

C H A P. XXIX.

The Way in which Cheshire Cheese is made.

IN laying down the general Methods of making Cheese in CHESHIRE, we must observe that there are in this, as in all other Things, some Differences; there are People in CHESHIRE who

make poorer Cheeses than others, but it is not to their Credit or Profit; and the Difference we observe in them, though in some Degree owing to the keeping, yet is also sometimes owing to the Condition in which they come from the Maker.

We have observed that the Cheshire Cheese is properly a new Milk Cheese. We have shewn, in the treating of the common Country Cheeses, that some make them with new Milk, enriched by the Cream of the last Milking, and others of new Milk, impoverished by an Addition of the skim'd Milk of a preceding Meal. In CHESHIRE their Pastures are so rich that they never find it needful to enrich their new Milk, for it will alone, with proper Management, make Cheese of the richest Kind that can be; but some of the CHESHIRE People impoverish their new Milk, by mixing the skimmed Milk of a former Meal, and this always debases the Nature and Quality of the Product.

This is the general Cause of the natural Poornefs of such Cheshire Cheese as is inferior to the common Sort; but this is a Practice carried on by few. Having just mentioned this for the Sake of passing upon it a necessary Censure, we shall lay down that Method which may be called universal in the County.

They are in the first Place particular as to the Condition of the Cow: and this is a Caution that all Farmers would do well to take from them: they find by Experience, in this great Cheese County, that the Milk of a Cow which has just calved, is not so proper as that a few Days after; therefore they never take the Milk of any Cow for Cheese till she has been milked four or five Times.

This Caution being observed they use their whole Store of new Milk, a very little excepted, for their necessary Uses, in the Cheese Manufacture. When the Morning's Milking is brought in, they strain it warm into a large Tub, and put in their Rennet. Four Spoonfuls is the Quantity they usually allow to as much Milk as will afford a Cheese of a Hundred Weight; and there are Dairies of such Consequence in that County, that they turn out two Cheeses of about this Size every Day, during the five Months they are in the right Season.

They cover up the Tub, and when it has stood half an Hour they open it, and find the Curd formed. They are very cautious to hit the right Quantity of Rennet, which no Rule can determine, because of the Difference in the Strength: for too little does not give the Curd a due Consistence, and too much makes the Cheese bitter.

After half an Hour they uncover the Tub, and press down the Curd with a large skimming Dish; and when they have pretty well cleared off the Whey, they get to work upon the Curd with their Hands, which they break to Pieces in the most perfect Manner, working it a long Time for that Purpose.

This done, supposing it for a Hundred Weight Cheese, they add one Pound of Salt: this they work in, and mix thoroughly well with the Curd.

This done they put the Curd into a wet strong

strong and large Cheefe-cloth, and when they have got the Whey tolerably well drained out, they put it into the Fat, or Mould, for four Hours, with a good Pressure, putting the Fat in the Cheefe Press, and working it down pretty strongly.

At the End of the four Hours they take it out, salt the Outsides, put it into a fresh wet Cloth, and put it into the Fat, and that into the Press again: here it is to be kept four Hours more; and in the mean Time a Quantity of good strong Brine is to be made of Salt and Water, and put into a large Tub.

When the Cheefe has been four Hours more in the Press they take it out, and put it into the Tub of Brine, and then let it lie eight Days, all the Time covered over with Brine, and turned once a Day.

At the End of this Time it is to be taken out, and laid to harden and dry. This is to be done in a particular Manner, and Preparation is to be made for it accordingly.

A Quantity of Rushes are to be cut up, and laid green on a large Board: on these the Cheefe is to be laid when taken out of the Brine, and for the first Day nothing is to be done to it; the next Morning it is to be turned and wiped with a Hair Cloth all over; and this is to be repeated every Day for twenty Days.

At the End of this Time it must be removed from the Bed of Rushes, and laid on the Floor; and it is here to be taken up, and turned once in three Days, and at every turning it is to be rubbed; till it gets firm and hard: as this is the compleating the Work, it is to be done very carefully; for if the due Degree of Hardness be not given at this Time, the Cheefe will be liable to Accidents in the keeping. Therefore it is an essential Point to let it lie long enough, and wipe it carefully.

When it is thus finished and hardned, the last Thing is the rubbing it over with some Butter, and this, though it may seem more trivial than the rest, is very essential: half a Pound of Butter is the proper Quantity for a Cheefe of a Hundred Weight, and this should be rubbed thoroughly in all over it, nothing more tending to preserve the Kind in good Condition, and keep the Cheefe sound.

This is the Method observed in that famous Cheefe County. They have Rooms built on Purpose, in many Places, for the drying of their large Cheefes, and they raise the Floors several Feet above the Ground, to preserve them from Damp. In many Places they use Shelves put round these Rooms, instead of using the Floor, which I think much the better Method, for the Cheefes are more secure to be out of the Reach of Damp, and they are more easily turned, and more conveniently rubbed and wiped, which is very essential.

CHAPTER XXX.

CHAPTER XXX.

Of making Cheefe like Cheshire, in other Places.

WHAT I have written in the preceding Chapter, concerning the making of Che-

shire Cheefe, is what I have collected from those who are much concerned in that Product, and from what I have myself seen on the Spot: for I once, some Years since, made a Journey thither for that Purpose, and took Notes of every Circumstance, intending to attempt the making a Cheefe of the same Sort.

Having thoroughly acquainted myself with the Method of working, I set about it at Home, employing the most careful Servants, that could be had, and over-looking every thing myself.

The first Trial did not succeed; and I made another; after the second I made a third, and being very much bent upon the Thing, I repeated the Experiment oftener than a wise Man should have done; for I found in the End I had been trying to make Brick without Straw, my Materials not serving me.

I was not at that Time so sensible as I am since made by Experience, that the CHESHIRE Manufacture depends, in a Manner, entirely upon the CHESHIRE Pastures. It was plain the Food was of great Consequence, and from the Failure of the Milk from one Pasture I tried that of another, and went the Round of all my own, and several of my Neighbours, but nothing would do. Some was too rank, and some too poor, but none came up to that excellent Richness of the CHESHIRE Kind.

This I have mentioned as a Caution to others: but there is no Need it should prevent their making some Trials, only let them learn from this Experience, not to venture so many.

There may be Grounds that will afford a proper Milk; but from such as do not, none can ever make this right Kind of Cheefe.

Wherever the Farmer has upon his Hands a rich, short, and sweet Grass, with numerous Blades, a full Body in each, and few rank Weeds among it, there it will be worth while to make a Trial; not to set aside the whole Business of his Dairy for such Trial, but to make one Cheefe. Let him give the Experiment fair Play, by making it in the first or second Week in JUNE, which is the Time when the very best Cheefes are made in CHESHIRE; and having made this Trial with all due Care, according to the Rules we have laid down, if it do not succeed let him give up the Expectation: if it do he has the Opportunity of making a Fortune.

Others beside myself have tried with as little Success, in various Parts of the Kingdom; but all this proves is, that we have not yet found any Pastures like those of CHESHIRE; but that is no Proof we never shall.

The Misfortune of these Cheefes made in the CHESHIRE Manner in other Places, is that they will not keep their Consistence; and when that is lost they soon decay. The great Happiness of the CHESHIRE Pastures is, that they furnish a Milk which has at the same Time great Richness and great Firmness in the Curd, which are the two Articles whereon the Firmness and Fineness of Cheefe depend.

C H A P. XXXI.

Of making Sheeps Milk Cheese.

THE Reader who is unacquainted with these Subjects, will naturally enough suppose a Cheese made of Sheeps Milk must be a very poor one: but this is a great Error. They prefer in CHESHIRE the Cheese of the neighbouring Parts of WALES, to the very finest of their own, giving thirty per Cent. more for it, and this is all made of the Milk of Sheep.

It is particular in Sheeps Milk that it abounds in Curd; all Milk, as we have observed, consists of the three Parts, Curd, Butter, and the watery or wheyey Matter; but it is the particular Quality of the Sheeps Milk, that it affords most Curd in Proportion of any other Kind.

It is natural also to this Curd to be tender; but there are Pastures on which the Sheep yield a Milk as proper for Cheese, as the Cows of CHESHIRE. These are principally in and about the Borders of WALES. I have examined them with Design to tell the Farmer in ENGLAND which of his own are like them, and I can give him some Hope of Success in this Article, if he will think it worth while to attempt the Manufacture.

DENBIGHSHIRE is the particular County where Sheep Milk Cheese is fine: this is as famous as the Cheshire of ENGLAND. The Pastures on which the Sheep feed there are hilly, the Soil rocky, and the Grass low, but very thick and entirely free from rank Weeds.

We have the same or very nearly the same Kind of Pasture in some Parts of HERTFORDSHIRE; and the Farmer will know it by the Shortness and dark Look of the Grass, and by the little blue Bell Flowers, which are the principal Weed that grows among it. In these Pastures Sheep yield a Milk, the Curd whereof is firm, and therefore there is all the Advantage, and little of the Inconvenience attending this Species.

The Cheeses made of this Milk are extremely rich and mellow. They never have any great Degree of Hardness; but their Richness is always a great Recommendation, and another is their ripening very quick; for one of a moderate Size will be fit to eat in four Months or sooner.

This may very well tempt the ENGLISH Farmer to make a Trial, and the Price may encourage him farther. 'Tis a Cheese that in many Parts of ENGLAND brings from five Pence to seven Pence a Pound Retail; and might be set at a much larger Rate in LONDON.

We shall acquaint the Farmer with the Method of making it to Perfection; but shall first inform him what he is to expect by Way of Quantity from these new-fashioned Milch Cattle.

Five Ewes, upon a good Pasture, will give at the Rate of two Gallons of Milk a Day: upon an indifferent one they will give a Gallon and half: so upon this the Farmer may judge how many he will set aside for this Purpose of milk-

ing. He may count five Ewes as the same with one Cow, and he will not be much mistaken.

The Sheep are to be milked Morning and Evening, and when they are a little used to it will stand very quietly. The Milk of the Evening is to be strained into that of the Morning, and when the Milkers come in the next Morning the whole is to be mixed with what they bring in. This is the Custom in WALES, where they make these Cheeses best; so that the Sheep Milk Kind is always what we call a three Meal Cheese.

When the Milk is all mixed, a little of it must be heated, and that poured into the rest to make the whole of the same Degree of Warmth with that which just comes from the Cow. Then the Rennet is to be strained in, and thoroughly mixed with it. As to the Quantity, it is to be about one fifth Part more than is used for Cows Milk.

The Vessel is to be covered, and stand quiet till the Curd is formed, and after that the Procedure is to be much the same with that on other Occasions. The Whey must be skimmed off, the Curd must be well worked in the Hands; and afterwards put into a wet Cloth and press'd, but this Pressure must be continued six Hours.

At the End of that Time it must be taken out, and the Cloth shifted; the Outside must be then salted, and it must be pressed six Hours more, the other Side being turned upwards.

While this is doing a Bed of Rushes must be made upon the Floor, and the Cheese, when taken out, must be laid upon it; and in this Manner it must lie a Fortnight, taking up and turning it every Day; and remembering every Time it is taken up, to rub it softly but thoroughly all over, with a dry and not very coarse Cloth. In this Time, drying gently and leisurely, it will get some considerable Firmness, for a Cheese of so mellow a Kind; and when it is thus far prepared, it is to be taken from the Floor and laid upon Shelves, where it will dry more quickly than at first, and be thoroughly finished.

This is the Method of making a Sheep Milk Cheese entire, and a very excellent and valuable Kind it is; but there may be a Sort made with Sheep and Cows Milk mixed, which will answer the Farmers Purpose excellently in many Places, where his Pasture would not serve for the making Cheese from the Sheeps Milk alone.

There is a Season when the Sheeps Milk may be had in Plenty, and without Inconvenience: this is when the Grass Lambs are sold off fat: the Ewes will then yield a large Quantity of Milk, and that regularly for some considerable Time; they should therefore be milked, and the Produce mixed with the Cow's Milk for Cheese. We have mentioned how Sheeps Milk abounds with Curd; and how fine that is in its Kind: being mixed with Cows Milk, the Curd produced from both has the Advantage of each Kind, it gets Firmness from the Cow, and a delicate Mellowness from the Sheep.

This Curd is to be made into Cheese in the Way we have described for the new Milk Cheese, and it will excel any that is made of new Milk from the Cow alone. I have had Cheese of this Kind made upon my own Ground, and

and when it has come to my Table some have taken it for one Kind of foreign Cheese, some for another; and every impartial Person has declared it better than most Kinds.



C H A P. XXXII.

To make a Nettle Cheese.

A Nettle Cheese is accounted, in many Parts of ENGLAND, a very dainty and excellent Kind; it is a very thin new Milk Cheese, with an exceeding fine and smooth Coat, that is the whole Matter. It differs from the common new Milk Cheeses more in the Form, and the Manner of making and drying, than in any thing essential in itself.

The Reader has observed that for the drying of the CHESHIRE Cheeses, which are large and thick, they use a Bed of Rushes spread evenly upon the Ground or Floor of the Room; and in the same Manner a Bed of common Nettles is the Matter on which these Cheeses are dried, and from which they receive their Name; the Nettles upon this Occasion are to be fresh cut, as the Rushes on the other; and the Manner of making the Cheese is this.

Let the Milk of the Morning's milking be taken for this Purpose, just as it comes in warm from the Cows, without any Addition or Mixture, for the enriching or impoverishing it; or the joining with it the Milk of any former milking. Let this pure fresh Milk be strained through the straining Bowl into a large Pan, or small Tub, and let there be immediately added to it as much Rennet as will be necessary to turn it. 'Tis then to be covered up half an Hour; then the Curd is to be press'd down, and the Whey skim'd off, and when thus separated the Curd is to be wrought in the Hands. When it is well worked it is to be put into a Cheese Fat, not more than three Quarters of an Inch deep, and press'd to get out the Whey.

The very same Method is to be used that was directed for the new Milk Cheese, and by this Means there will be a very fine one Meal Cheese, thin and delicate, prepared, and ready for drying. It is then the Nettles come in Use. When it has been sufficiently press'd it is to be laid on the Floor, which is to be first spread over with fresh Nettles, and another Parcel of the same is to be spread over it.

Care must be taken in the cutting and laying of these Nettles, for the Cheese is to have an even Coat, and that will depend entirely upon the Management in this Particular. In the cutting then it must be observed, that only young Nettles are to be taken, or the tender Tops alone of such as are more grown; and these, when they have been laid evenly upon the Floor, must be press'd down, and flatted carefully into an even and smooth Surface: this is the essential Article whereon the Smoothness of the Coat of the Cheese depends; and if there be any thicker Stalks, they will take Effect upon the tender Surface of it, and even any rumpled Leaf will have the same Consequence. When the Bed is made flat and even, the Cheese is to be laid carefully

upon it, and a Coat of the same Kind spread evenly over it. Every other Day fresh Nettles are to be brought in, and the Cheese is to be wiped and laid upon the new Parcel, covering it with fresh ones also. In this Manner it is to be kept till it is ripe and ready for the Table, and no Cheese ripens finer.



C H A P. XXXIII.

To make a running Cheese.

THIS is a greater Delicacy than the former, and is a richer Cheese, with the same Advantages of ripening; it is made thus. Mix together equal Measure of Stroakings of the Cow, and of rich Cream, put this in a clean Pan. Set it in a Pot of Water, that the Water may reach up on the Outside as high as the Cream and Stroakings do within; then set the Pot on the Fire, till the whole be as warm as Milk from the Cow.

Take the Pan out of the Water, and put in as much Rennet as is sufficient to turn it. Stir this well in, so that it may mix thoroughly, and then cover the Vessel.

When it is come, press down the Curd, and take off the Whey: then heat the Whey scalding hot and throw it upon the Curds, and after this take up the Curd, which will now be in a Body: this must be done carefully with both Hands; and the Curd is to be raised up as whole as possible without breaking it, and so laid into the Fat; then place it in the Press, and put a small Weight upon it; afterwards put on a larger, but don't bring it to the Screw Press, for it is too delicate for that forcible squeezing.

When the Whey is got out let it be taken out, salted a little, and laid upon a fine even Bed of Nettles. The Leaves of the Nettles stripped from their Stalks, should be used for this Purpose. It must be shifted as the other, and will be very ripe in three Weeks or less. Three Pints of each of the Ingredients makes a proper sized Cheese of this Kind.



C H A P. XXXIV.

Somersetshire Cheese.

THIS is a large and rich Kind of Cheese, named from the County whence it is brought, and where it is principally made. The Bigness is a very material Article, for I have seen the same Kind of Cheese exactly, made smaller, and it has been not at all particular, or scarce seemed of the Nature of the larger. What is farther singular in it is, that there is Butter worked into it, which greatly helps the Mellowness.

This is to be made thus. Let the Milk of twelve Cows be set over Night for Cream; and in the Morning let the Milk of the same Cows be brought into the Dairy warm from them. Let the Cream be carefully taken from the overnight's Milk, and mix'd with this Milk of the Morning, let all be strained together into a

large Tub, and as much Renner put in as will be sufficient to turn it. Let it be covered up for half an Hour, then open it, break and press down the Curd; separate the Whey, and when the Curd has been well worked in the Hands, to a Cheese of this Size there must be allowed three Pounds of fresh Butter. This must be well worked into the Curd with the Hands, and a little Salt sprinkled over it, and also worked in.

It is then to be put into the Press in a large wet Cloth, and it must be turned very frequently, every Time using fresh wet Linnen, till toward the last, and then there must be three or four dry Cloths.

When it is put in for the last Time it must be somewhat firmer pressed than before, and it ought to remain in the Press forty Hours. When it is taken out of the Press it must be washed over with Whey, and laid in Cloths till dried. It is finally to be laid on a Shelf, that it may dry perfectly, and there must be turned very frequently, and every Time carefully wiped. It will, according to its Size, take a considerable Time in drying; but it will become in the End a very rich and fine Cheese.

CHAP. XXXV.

Of the early Use of Wool in the Eastern Countries.

WE have shewn our Husbandman the proper Management and various Uses of Milk, the Produce of his Cows, and we are now to consider the Nature, Qualities, and most advantageous Uses of Wool afforded by his Sheep.

Wool has been considered at all Times as a most valuable Commodity; and that of our Country is preferable to most other upon the Earth. We find the Use of Wool known in the earliest Periods, and Flocks of Sheep are mentioned in the first Ages of Mankind, whether we read of them in Sacred or Profane History. Kings and Lawgivers have not been ashamed to employ themselves in the Care of them; and therefore the Country Gentleman needs not think their Wool an Article beneath his Dignity. We wish to make a Regard to it more universal, and shall endeavour to render the whole Knowledge of it familiar.

We read in Sacred History that the Patriarch ABRAHAM had Flocks, and the ISRAELITES of that early Time all employed themselves in the Care of them: their Neighbours the MIDIANITES had such Numbers at that early Period, that the ISRAELITES took among the Spoil after their Success against them, more than six Hundred Thousand; and drove to their own Lands: and two Hundred and fifty Thousand were taken from the HAGARITES by the Sons of REUBEN.

The ETHIOPIANS had Sheep also; for when ASA conquered a Part of their Country, he carried away Sheep in Abundance: the ARABIANS at the same Period had also Sheep, for they brought more than seven Thousand Rams at one Time to JEHOSAPHAT; and the MOABITES must

have bred them also in great Quantity, for MESHACH, King of that Country, rendered to the King of ISRAEL a hundred Thousand Lambs, and a hundred Thousand Rams.

These are Passages of History delivered in the several Parts of the Old Testament, according to the different Circumstances that introduced them; and by these we find that at this remote Time, much earlier than the utmost Extent of any other History, that the ISRAELITES had Sheep in great Abundance, and that the MIDIANITES and HAGARITES, the ETHIOPIANS and the ARABIANS, and the MOABITES fed them also in vast Quantities.

Here therefore is an Account of Sheep bred and tended in a Manner all over the Eastern Quarter of the World; and we have occasional Mention also of the same Creatures making a chief Object of the Care, and a principal Article in the Riches of the AMALEKITES, the PHILISTINES, and the People of DAMASCUS.

These are Countries whose Extent and Situation are very well laid down by the Labours of the Learned of later Time, and by this we see a great Part of the Quarter of the World, then most inhabited, devoted to the Care of this useful Animal.

That this Creature was bred not only for its Flesh, which some have very idly pretended, is evident also from many Passages. The Mention of Wool is made in some of these, and in others there are Allusions to the Implements of Weaving, which though they may be applied to either the weaving of Woollen or Linnen Cloth, yet as mention is in the same Books made of Wool, and of the Methods of preparing it for the Loom, they must be allowed often to refer to this Article.

That the ISRAELITES themselves fed Sheep for the Wool, may be seen by the Tythe exacted on it. In the eighteenth Chapter of DEUTERONOMY, the first of the Fleece of the Sheep is declared the Due of the Priest: and that other Countries knew its Value in the same Manner, is plain from an Instance in the Present of the MOABITISH King before-named, which is, that the Rams were given with their Wool.

The Staff of GOLIATH's Spear is said to be equal to a Weaver's Beam: the Fullers Field is mentioned in ISAIAH and by the Prophet MALACHI; and EZEKIEL, in the twenty-seventh Chapter, calls the People of DAMASCUS Merchants in white Wool.

We have recited these Passages, which contain the Summary of what is said concerning Flocks of Sheep, their Wool and its Manufacture, in the Scriptures, to shew that the sheering of Sheep, the Use of Wool, the manufacturing it into Cloth, and the preparing that Cloth by fulling, were Articles known in the earliest Time. It establishes the Care of this Animal, and the Use of its Fleece, upon a very great Authority of antient History: it produces Examples that may animate private Gentlemen to interest themselves in the Care and Management of its Fleece, and Kings and Legislative Powers to establish and encourage the Manufacture of it. This Attention both of private Persons of Fortune, and of the Publick Authority and Regard, is greatly want-

wanting at present in ENGLAND, for the Advancement of our Woollen Manufactures.

It has been said that GREAT BRITAIN and IRELAND naturally were the Resources of the rest of the World for Wool; but this has been a fond Mistake, and has led the Publick into a Neglect of that Concern, from which it will not be easy to recover.

We have shewn here that Wool was produced in Abundance, and wrought into Cloth for common Service in the whole Eastern Part of the World, before any thing was known of BRITAIN; and we have found by Experience of late Time, that there are many other Countries in EUROPE which may rival us, if we neglect the Care, or our Legislature the Encouragement.

It is leading the Husbandman into a false Calm, to make him imagine that the natural Quality of BRITISH Wool is so superior to that of other Countries, that he may manage as he will, and it will still have the Preference. Other Nations have been eminent in this Article before BRITAIN was attentive to it. We know not whether this Island was peopled at the Time of the earliest of the Transactions above-named, in which Wool is mentioned so importantly; and even long after, when the enterprising Genius of the PHÆNICIANS pushed their Navigation and their Traffick hither, this Commodity was not known amongst our People.

They traded hither for Tin, which they purchased on the SCILLY Islands near the Land's End in CORNWALL, then called the CASSITERIDES; and as they came hither on that Account, they took of those early BRITAINS also all that they had to offer in Commerce. The several Articles are named, and Wool is not of the Number. STRABO has committed to Posterity the different Commodities: they were beside Tin, the great Article which brought those remote People hither, Lead, Corn, Cattle, Gold and Silver, also Dogs of a particular Breed, the old and famous ENGLISH Bull Dogs; and what comes nearest the present Article, Hides. These were the several Articles furnished by the BRITONS, and we see they had a Market for whatever was the Produce or Manufacture of their Country, but they never brought Wool to the Traders, though they sold them Hides. Therefore we see that BRITAIN, far from having at all Times supplied other Nations with Wool, was a Country that late fell into that Concern; and that there were Manufactures of Woollen in the Eastern Countries, and probably in many others, before the Use of the Fleece appears to have been known in this Island.

This is not wonderful, because the Inhabitants of a great Part of the Kingdom went naked, and those who covered themselves with any thing used the Skins of Beasts, in a rough and savage Manner.

As we have here shewn from Sacred History, that this was the State of the Case, we shall, in the succeeding Chapter, shew it appears also in the same Light from other Authorities; and from that we shall deduce the Lesson of Industry, Care, and Application to the Affair of Wool, for the Service of all concerned, from the meanest Farmer to the Sovereign. It appears that other

Nations were acquainted with this valuable Commodity before it was known in BRITAIN: they may therefore supplant us in all Places; as they have in many, in this Article.

Our Husbandman has it in his Power to raise his Woollen Manufactures, under the Encouragement of the Government, to a greater Perfection than other Nations: this is the Advantage of our Country, let us not suppose we have more than we have, but knowing the true State and Limits of our Pretensions, let us use every Method to improve them.



CHAP. XXXVI.

Of the early Use of Wool in other Countries, according to general History.

ALL the old Historians mention the Care of Flocks, and Value of their Wool; the GREEKS, of all the Periods we know, used it for the Purposes of Cloathing, and they refer to Times much earlier than their own, as familiar in the same Use; the famous TYRIAN Purple was employed in dying woollen Cloth; and the early Expedition of the ARGONAUTS to COLCHIS, for what was called the Golden Fleece, however it have been represented, was no more than a Voyage of Traffick in Search of this Commodity. The Naturalists may suppose their Voyage was in Search of Gold, and the Adepts pretend that the Secret of the Philosopher's Stone was couched under this Mystery; but plain Reason, and the most authentick Accounts of the Transaction, taken in their plainest Sense, say nothing more than this; that the People of COLCHIS understood the Management of Sheep, and the manufacturing of their Wool, better than any other Nation of that Time; and that JASON, and his Partners, in that Expedition, after encountering many Dangers at Sea, and in their first Intercourse with them, brought back a Quantity of the Wool, and a Number of the Natives to manage the same important Article in their Country.

The City of CORINTH became afterwards a general Mart for Wool and woollen Manufactures, and therefore all Commodities in general: and after POMPEY had scattered the Pirates, the same Article was a very considerable Branch of the Commerce carried along the Coasts of the Mediterranean Sea.

In all these Ages, while so considerable a Traffick was carried on with Wool and woollen Cloths, in the several Countries we have named, nothing was known of BRITAIN. The Knowledge the PHÆNICIANS had of our Country was lost; and they had never communicated it to any other People. This Island subsisted as a Place separated from the whole World, and unknown to all its Inhabitants; and the Histories, such as they are, that give an Account of BRUTUS the TROJAN, and his Descendants, their Wars and Victories, mention not a Word of this important Article.

Our Ancestors, somewhat more civilized in those Ages than they had been in the preceding, might, for ought we know, have begun to manufacture

nufacture Wool: that they might do so is all that can be alledged, we do not know they did; and of this we are very certain, which is the main Point concerned in this Place, that if they had the Knowledge of it, they served none but themselves; they had in these Ages no Commerce with the rest of the World: that was supplied one Country by another; and we see abundantly the Error of those who fancy this Island the natural Source of that Commodity.

We not only know that other different Kingdoms at that Time were famous for their Production and Manufacture of Wool, but we are told of several of them by Name. The same accurate and faithful Writers who give an Account of the Commodities of BRITAIN in those early Times, and do not name Wool among them, name that Article as a very valuable and first Rate Commodity in respect of others. SPAIN is mentioned with great Commendation, in respect of the Wool it produced in those early Times, and the Manufactures made from it: insomuch that some attribute the Invention of weaving woollen Cloth to the People of that Nation. Wool was received in the early Times from many Parts of the Euxine; and the Trade of the Baltick was, in a great Measure, supported by it. The ARMENIANS of the same Period purchased Wool and woollen Cloths of the TURKS, in Exchange for Horses. ROME in somewhat later Times, received woollen Manufactures from ALEXANDRIA. This all stands established on the best Authorities; and is related by all the Authors who have, in any Part of their Works, had Occasion to mention the Commerce of those early Ages. In all these Times BRITAIN continued negligent of this Matter, as is evident from the Silence of all those who mention the woollen Trade of other Nations, among the most considerable Articles of their Commerce; and say nothing of it in respect of this, when they treat of the Products of it, and the Traffick carried on by them.

It will be seen, in the succeeding Part of this Work, how valuable a Part of our natural Advantage we neglected in this Article; and we shall, I hope, be cautioned not again to lose so great a Benefit, which so many others have, at different Times, taken from us, and will always be ready to take from us again, if our own Assiduity, and due Support from the Government do not prevent them.



C H A P. XXXVII.

Of the Wool of different Parts of the World; its Condition and Qualities.

IN the Countries that lie far North, the Wool is generally coarse, and of little Value.

In ICELAND it is as coarse as Hair, and in small Quantity. In NORWAY the Wool in general is but poor, though there is some tolerably good; that of their natural Sheep is short and coarse, and such as they bring over from other Places often die in the hard Winters. They work it up into Manufactures at Home, but they are of the poorest Kinds: their Cloth is

little better than Flannel, and the principal Use of it beside is in a coarse Kind of knit Stockings, which they not only make for themselves, but for Exportation to the other Northern Countries, to the Amount of sixty Thousand Pairs a Year.

In SWEDEN the Wool is also very coarse, short, and poor: they have been used, till of late, to have their woollen Goods from us, but they have since encouraged Manufactures so far, that they have a coarse Cloth of their own Fabrick, and to promote the Care of this Branch of their own Trade, a Duty is laid on the ENGLISH.

In MUSCOVY they have Abundance of Sheep, but their Wool is not fine.

In POLAND they have some Wool, but it is not excellent.

GERMANY, in many Parts, abounds in Sheep, and their Wool is fine, and the People understand very well how to make the best Advantage of it.

In the AUSTRIAN NETHERLANDS there is Abundance of fine Wool, and many of the woollen Manufactures have been either invented or improved to a great Height there.

FRANCE is not famous for its Wool, though some in the Southern Provinces is very fine, but they import a great deal, and to our great Disadvantage, from ENGLAND, among other Places; working up our own Produce to supply other Markets in our Stead.

SPAIN produces a good Quantity of Wool, and it is the finest in the World: we err in supposing that of our own Country excels all others, this is an Instance of the Error, and there are several others.

PORTUGAL has Wool also little inferior to the SPANISH: it is fine and delicate, and fit for the nicest Works.

ITALY affords so much Wool that a great deal is annually exported, and it is very good: the VICENTINE and PARMA in particular are famous for a fine and valuable Kind.

In HUNGARY and TRANSILVANIA there is a great deal of Wool produced, though not of any particular Excellence, so that it is less sought by Strangers, and in general it is worked up at Home.

In TURKEY they have Abundance of Sheep, and they carry on a considerable Traffick in Wool.

In SCOTLAND a great deal of good Wool is produced, though not equal to that of ENGLAND. In GALLWAY, TWEDALE, and more North, they have what is very fine, and they understand it very well. They had the Art of making Broad Cloth in great Perfection before the Union. The GLASGOW Plads exceed all other Manufactures of that Kind; and they have many other very good ones. There is a Method in the dying the red Part of these Manufactures, which the SCOTS have the Address to keep to themselves, and which keeps them the Pre-eminence in that Manufacture, though all the Arts possible have been used by our People to discover or purchase the Secret. The SCOTS are more honest than our People of the same Rank; it would not have been easy to have kept a Secret of that Importance in ENGLAND, which was necessarily entrusted to so many People.

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In the East they at present less regard the Produce of this Commodity; because their principal Manufacture are in Silks and Cottons, but there is a great deal of very fine Wool in ASIA, SYRIA, and PERSIA. They have a particular Breed of Sheep in this last-named Country, whose Wool is long and greyish, and they make certain peculiar Manufactures of it, and those much esteemed.

In CHINA and the EAST-INDIES the Produce of Wool is so great, that they shear their Sheep three Times a Year: and in AMERICA they feed Abundance of Sheep, whose Wool, in many Parts, is little inferior to that of our own Country.



C H A P. XXXVIII.

Of the Methods of managing Wool in different Parts of EUROPE.

THE FRENCH, who very well know where the best Wool is to be had, get what they can from ENGLAND, not a little from SPAIN, and purchase it wherever good is to be had in other Places. The foreign, as well as their own, they divide into separate Parcels, according to the Degrees of Goodness, before they work it up or dispose of it. Most other Countries have the same Practice, and from their dividing it into three Kinds this is called the Triage of Wool.

These three Kinds are called; in all the modern Languages, the first, the second, the third Kind of Wools. And when the Fleece is sold entire, there is usually made a Distinction, according to its Quality, into a first or a second Kind: the fine and the coarse being distinguished by these Names.

The Proprietor has his Choice to sell his Wool in the Gros, as it is shorn, or to clean and separate it; and in general the best Method is to manage every Commodity as well, and work it as far as the Knowledge or Convenience of the Husbandman will permit; for those who buy Things in the Rough, as they call it, always make themselves large Allowances for Waste and Labour in the working. In many Articles the Difference between selling the Produce in this rough Way, and selling it wrought, so far as the Farmer can conveniently do it, is Thirty per Cent.

The Wool of SPAIN is principally from CASTILE, ARAGON, and NAVARRE, and of these the first is generally the finest. It makes an admirable Mixture with our ENGLISH Wools. Those of FRANCE are, by all Acknowledgement, greatly inferior to ours; yet they by a proper Mixture of the SPANISH, and a good Fabrick, have produced Cloths very little inferior to our own, when we have kept our Wool entirely from them. Our People should in this learn from their Neighbour's Policy.

In SPAIN, where they are very choice of their fine Wool, they have five different Ways of selling it; and the ENGLISH Farmer should observe the Difference for his own Information. They sell it, sometimes singly on the Sheep's Back,

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secondly, Coarse as shorn; thirdly, Washed and cleaned; fourthly, Wash'd, cleaned, and triaged; that is, separated into the finest, second, and coarser Kind; and fifthly, On the Sheep's Back at a general Price; to pay for one Pile what other Piles of the same Quality shall be sold for. They generally find the fourth Way the best for the Seller, and the fifth the best for the Buyer. 'Twas once a Custom in ENGLAND to sell the Wool in this Way, but our Farmers are grown wiser, and we hope they will continue to be so.

The Difference in Quantity between the Wool as it is shorn, and when washed and cleaned, is about one half: sometimes the Waste is a little less, sometimes a little more, but usually about this. The second Cleaning, which prepares them absolutely for Cloth, reduces them near a fifth; and this is the whole Waste in general Terms.

This will inform the Farmer upon what general Conditions he may set the Price of his Wool, if he chuse to part with it rough, but it will in this, and all other Articles, always be his Interest to work them as far as he can himself: this is so universal, that he should understand it as repeated under every Article.

Upon the whole, having looked into the Produce of the Wool of different Countries, we shall do well to consider the Nature of their Pasturage, and other accidental Things of every Kind, that the Farmer may see not only where the best Wool is produced, but form some rational Guess to what the Excellence is owing.

In general two Things contribute to the Fineness of Wool, the Sweetness of the Pasture and the Cleanliness of keeping.

In SPAIN, where the Wool is excellent, the Grounds are in a Manner barren, in Comparison of those in many other Countries, and in many of the Northern Nations we have mentioned, as producing indifferent Wool, the Meadows are covered with a very rich Grass: but then the little Grass of SPAIN is sweet, and this abundant Quantity of the Northern Kingdoms is harsh and sour. A coarse Grass makes a coarse Wool; and to this we may attribute the ill Success of those several Schemes which have been practised, of carrying the Sheep of Wool Countries into others not famous for that Produce; the Kind is not of so much Importance in this Matter, as the Nourishment; and the same Sheep in a sweet Pasture will yield the finest Wool, that will afford but indifferent on a coarse Grass.

The practical Rule to be drawn from this is, that the Farmer who has a Mind to raise the Credit and Price of his Wool, should first chuse a proper Breed, which we have sufficiently directed under the Article of Sheep, and then feed them principally, if not entirely, upon his sweet high Pasture Grounds.

Cleanliness is the next Article, and this follows the other in Course, for the Sheep on Downs are always much cleaner than those in low Grounds. The FRENCH cannot be so careful in this Respect as we may, because the Fear of Wolves renders it necessary for them to house their Sheep in Winter; and in this Case there is no Possibility of their living so sweet and clean, as when they went on in an open Pasture, and

7 K

touch

touch nothing but the Grass washed with the Dew of Heaven.

Our covered Fold for raising Manure from the Dung and Urine of Sheep, will be little Disadvantage to their Wool, if the Earth thrown into it be of a sandy or dry loamy Kind, and none answers that Purpose better.

C H A P. XXXIX.

Of the Origin of the Woollen Trade of ENGLAND.

WE have seen how late, in Comparison of other Nations, the People of BRITAIN fell into the Care of Wool, and the manufacturing of it; and we shall find, upon farther Enquiry, that by all we have remaining on the Subject, the Progress made in it was at first very slow.

This is the more to be lamented because we have, and always had, the finest Pastures in the World. The improved State of Husbandry has, from time to time, brought in new Advantages to tilled Land, and none more than the latest; but at all Times the Pasturage must have had its Character of Excellence and Superiority, nay probably in the Times when Agriculture was least improved, that Part of our Produce was best, because then the best Lands lay for it. Grass is a Product of Nature, in which she needs no Assistance from the Hand of the Labourer, or Genius of the Husbandman: her own Hand plants the Growth, and the Rains of Heaven are all it needs for bringing it to Perfection.

There never was any Time therefore in which this Country wanted the Means of feeding Sheep, and consequently there has been no Time when it might not have produced Wool in Abundance: we have the same Advantage over all other Countries in the World, at this Time, in respect of our Pastures: and let the Husbandman well regard it. Let him remember how many Ages other Nations, as we have shewn him in the preceding Chapters, ran away with the Profit of this great Commodity, before his Ancestors in this Island thought of interesting themselves in its Concern; and let him recollect later Instances in which they have, and in which, I am sorry to say, they do rival us through our Neglect: what Advantage they had before the BRITONS entered on the Trade they may have again, if it be neglected on one Hand, or restrained by Authority on the other: and let these Considerations have their Effect in the stirring up all Ranks to promote and patronize it.

If we would know by what slow Degrees the Care of Wool, and the Profits rising from it, became known in ENGLAND, we must refer to those Records in which it has been occasionally named, or in which any thing concerning Sheep is to be found; for we are not to expect that we shall, in any early Time, find an Account of a Trade established on this Article.

We have shewn that the Generality of our Ancestors, in early Time, went naked, and that Skins were the Covering of the rest; in the Time

of the ROMANS Commerce became more established in this Island; and LONDON was a Place of great Traffick: but Wool was not of the Number of the Articles in which either our own People, or the ROMANS settled among them, traded.

One of the earliest Notices we have of Sheep in BRITAIN, considered with respect of their Value is found in STILLINGFLEET*, who tells us, That between the Years seven Hundred and twelve, and seven Hundred and twenty-seven, were made certain Laws of King INA, and in those a Value or Price was set upon the Sheep Kind. The Price of an Ewe and her Lamb together; till a Fortnight after EASTER, is there set down at One Shilling. The Value of Money was then very different from what it is now, but this, with all the Allowances that can be made on that Head, is but a very poor Price.

We may learn by it that in King INA's Time the Care of Sheep was grown to some Concern in the Island; and there are other Passages of the same Period, that shew Wool was an Article comprised in the Purchase of these Creatures; but by all we learn on this Head, the Art of working it was but at a poor Height; nor was any of it exported either wrought or raw.

ALFRED, a Name famous for Military Achievements, and also for the Care of Arts and Commerce, took no small Pains to improve this Manufacture; but they did not much succeed; 'twas in the Year 885, he set in earnest about this great Work, but Wolves were too numerous in the Island to let Sheep be kept in Safety.

The Consequences of the Encouragement this Sovereign gave to the raising these Animals, was seen in the succeeding Years; for in 918, EDWARD, who had married the Daughter of a Country Gentleman, distinguished by the Regard he had shewn to this great Concern, and thence called by those who little understood what they read in earlier Writers, a Shepherd, had his own Daughters instructed in the Art of carding, spinning, and manufacturing Wool.

This double Patronage bestowed by EDWARD, the Countenance he gave to one who employed himself in breeding Sheep, and the Example he set in making his Daughters work the Wool, was of so much Assistance to the Manufacture, that the Pasturage of the Southern Countries became mostly occupied in feeding Sheep, and every one, fond of recommending himself to the Royal Favour, became a Shepherd, or at least employed his Attention greatly on that Article.

The Wolves were for some time the principal Obstacle to the Progress of this great Undertaking; but after many Struggles with this Inconvenience, EDGAR, about the Year 961, setting a Price upon their Heads, and by every other Means encouraging their Destruction, three or four Years did the Business: there was not in that Time a Wolf left in the Kingdom.

The Value of the Sheep rose in Proportion to the Number propagated and preserved: for with the Increase in the Quantity of Wool, the Number of Manufacturers increased, and the Demand for it enlarged. The same Author who tells us that in 720, in the Time of INA, an Ewe and her Lamb together, were valued only at a

Shilling

* Chron. con Pre. siosum, p. 20.

Shilling in the best Season, shews us that in 1000. under the Reign of **ETHELRED**, a Sheep alone was worth a Shilling, without any Restraint of Season †. This Shilling was **SAXON** Money.

This shews that the Value of Sheep rose, but it also shews that it was but slowly. No Exportation of Wool, or woollen Cloth, is yet heard of in the Market at Home; and People principally wrought up the Produce for the Service of their own Families.

A Hundred Years after we find by an accidental Passage, that the Value of Sheep was rather decreased than encreased, so that we may see the working up the Wool did not thrive very fast. The black Book which contained the Taxation of every Man, toward the Support of the King's Houshold, there mentions Money as an Equivalent for Cattle, and the Sum on each Article is stated. Ten Years before this Time we find, that if a Sheep was lost the Damage was estimated at Five-pence, but on this Occasion the Price laid upon him who chose to pay his Tax in Money, instead of Cattle, was only Four-pence in the Place of One Sheep.

Pursuing this Subject in the old Records, we find the Sheep more numerous in all the succeeding Reigns, and we see their Value encreasing constantly with their Number. In the Time of **HENRY** the First, about the Year one Thousand one Hundred and Twenty, forty Sheep were valued at One Pound.

In one Thousand one Hundred and Eighty-five an antient Record tells us, that by the Custom of **BELESHAL**, the Tenants of **SHERBORN** were, on certain Occasions, to make their Acknowledgement by delivering a Ram, but if they chose to pay in Money, the Price was fixed at Eight-pence.

The Reader is not to imagine that this Price established upon Sheep, had Regard to their Flesh for Food, without Respect to the Wool: it is true that all Historians are silent upon the Progress of that Commodity and its Manufactures, but we have, a few Years thereafter, a memorable Instance of the Regard shewn to it as a National Commodity.

RICHARD the First, in the Year one Thousand one Hundred Ninety-three, returning from the Holy War, was taken Prisoner by the Duke of **AUSTRIA**. A vast Ransom was required, and toward raising it one Year's Wool was demanded from two of our Abbeys. This is a Passage recorded by **RAPIN** †, and all the common Historians, and is supported on the best Authorities: and this shews, though we have not had any regular Account transmitted to us of the Progress of this Article of Commerce, that all the Time the Price of Sheep was encreasing the Value of Wool was rising, and that this was the principal Cause of their Encrease in Value: and we find that at this Period Wool was become the first Commodity of the Island: the Thing next named in Purchases to Money.

Till this Time we hear, as I have before-observed, nothing of any Use of Wool, except for our Home Consumption, but this Transaction seems to have opened the Eyes of the neighbouring Nations. Having received **ENGLISH** Wool in Payment they found it excellent, and they

began to think of it as a Purchase. The Pastures of **BRITAIN** now shewed the World their Excellence for the feeding this useful Animal, and the Husbandmen began to acquire a Reputation for its Management. Exportation of Wool became a common Practice, and the Article from this Time grew so important, that it was the great Source on all Emergencies. It was the Land Tax and the Malt Bill of those early Periods.

The first Notice of its Exportation is in the Year one Thousand one Hundred and Ninety-eight, only five Years from the Time of **RICHARD**'s Ransom.

In this Year we find, in **MADDOX**'s History of the Exchequer, that **GERVASE DE ALDERMANBURY** †, rendering an Account of the Chamberlainship of **LONDON**, gives in this singular and important Article: Fines from Merchants for Permission to export Wool and Leather Twenty-three Pounds twelve Shillings.

At the same Time that Quantities of Wool began to be exported, the manufacturing of it at Home encreased. The same Exchequer Account gives a List of several Sums by the Sale of Wool at Home; of twenty Pounds from one Person, and of two Hundred and Twenty-five Marks from the Seizure of a Quantity that was attempted to be smuggled out of the Kingdom, or exported without paying the Fine for Leave.

This is an Article recorded in the same Author, and it tends very happily to the shewing the real Price of Wool in **ENGLAND** at that Time.

The Quantity of Wool seized on this Occasion was forty-five Sacks. Each Sack we find was valued at five Marks, and each Sack contained twenty-six Stone of Wool. This settles the Price of Wool in **ENGLAND**, in the latter Part of the Reign of **RICHARD** the First, at little more than Two and Six-pence a Stone. This Two and Six-pence was, at that Time, one Eighth of a Pound Silver, and was equal to about three Times that Quantity or Weight of Silver now; that is, to seven Shillings and Six-pence.

The Reader will, we hope, not blame us for descending to Particulars in a Point of this Curiosity and Importance. We shall endeavour to trace the History of this Commodity from the best Records of earlier Time, and shew him its Advances and Decline under the different Encouragements or Oppressions of its Manufacture.

About thirty Years after the **ENGLISH** found the Way of serving their Neighbours with our Wool, we improved so far in our own Manufactures of it, as to get into the Art of dying. At first Wool was only wrought up in a coarse plain Way for the Cloathing of the Farmer and his Family: by Degrees those who best understood the working of it up, brought what they had to spare from the Service of their Family to Market; but all this Time the Wool was only wrought up as it was furnished by the Sheep, and all Cloth was of the same Colour.

They found that those who imported Wool and woollen Cloth from us, in its natural Colour, dy'd it at Home; and they soon learned the Art of doing the same here. We read in the Sta-

† *Maddox's Hist. of the Exchequer*, p. 532.

tute Book, that in the ninth Year of HENRY the Third, dy'd Cloth was limited by a certain Law, as to its Quantity and Measure.

Our Wars with FRANCE, and other Difficulties, broke in upon the Progress of our National Trade in 1242. the Persons and Effects of the ENGLISH Merchants in FRANCE, and those of the FRENCH Merchants in ENGLAND, were seized in Consequence of Hostilities between the two Nations; and in 1275. all Commerce was prohibited between ENGLAND and FLANDERS, upon a like Account; but upon this Occasion we find an Instance of the great Height to which the Wool Trade of ENGLAND was arrived at that Time, for a few FLEMISH Merchants were permitted to carry over a Quantity of ENGLISH Wool with them, paying the King for the Permission. This Quantity was no less than a Thousand and Sixty-eight Sacks, and the Price for Leave of Exportation was ten Shillings a Sack. We see by this how swift a Progress the Commerce of the Kingdom, in this Article, had made, when the Husbandmen understood the Value of the Commodity; and the Legislature encouraged its Manufacture.

We find by the Accounts here given, how little Historians and others have considered this important Article. Those who speak of the Manufacture of Broad Cloths in ENGLAND, follow one another in placing the Time of their being first made at the Year 1331. We see from this Circumstance, countenanced by the Statute Book, an unerring Guide, that they were not only made but dy'd so early as in the Year 1220. one Hundred and Eleven Years before that Time; and probably the Origin of the Manufacture was much earlier than that.

The Quantity of Wool our Country produced soon after, is to be guessed from the vast Exportation we have named under those FLEMISH Merchants; and this as recorded punctually by RYMER *.

* Rymer,
vol. 2. p.
50.

In 1284. foreign Merchants were permitted to establish themselves in the Kingdom, for the Encouragement of the woollen Manufactures. They had till this Time been obliged to lodge in the Houses of our own People, and could not trade otherwise than by making their Landlords their Brokers; but now they were permitted to traffick in their own Names; and the Privilege granted to them was of the utmost Benefit to the Trade.

In 1291. SANDWICH in KENT was made the general Market, by an Act of EDWARD the First, and so vastly did the Trade encrease, and the Manufacture flourish, that but five Years after this the Custom upon it was raised from twenty to forty Shillings a Bag; and the Traffick was able to support it.

This Demand was indeed repealed, but not because it would have ruined the Trade, but because it was made by the King's sole Power. That was a Stroke too arbitrary for those Days of virtuous Liberty: the Merchants exclaimed against it, and they obtained a Release from the absolute Exaction, the additional Duty being charged by this Act upon them with such Limitations, that it was in a Manner dependent on

their Pleasure; and soon afterwards it was left to the Determination of Parliament.

A few Years after this we find the Traffick for Wool and woollen Manufactures very flourishing in LONDON; and several of the Sea Port Towns: the King's Duty upon exported Wool was established upon it according to the Weight; and the Scales for weighing it in all Parts were made by those in LONDON, and delivered in a solemn Manner by the Lord Mayor into the Exchequer, to be sent to their respective Places.

In 1297. the Wars with FRANCE demanding a great Supply: the woollen Trade was so flourishing that Recourse was had to it. The Parliament granted for two or three Years forty Shillings a Sack upon Wool. This was the Exaction that had occasioned so much Disturbance at first; but now it was legally established and regularly paid. The King promised never to demand more than the old Duty, without Consent of Parliament; and the woollen Trade flourished under this large Drawback, and the Disadvantages of a War together.

These were Times of virtuous Government. The King was thankful to his Subjects for so large a Supply, and he was happy to find that the woollen Trade could bear it: but he demanded it no longer than it was required by the Exigences of the State, on Account of which it was raised. He called a Parliament; and of his own free Accord gave up the additional Duty, publishing a Proclamation that no more than the old Sum should any where be demanded.

The Price of Sheep now naturally rose with the Value of their Wool, but still the Number made some Alteration. We read in THORN † of three Shillings apiece being given for three Hundred Sheep; but it was at an Installation Feast, 1309. The current Price about that Time was much less, as we find in the Acts of the Common Council of LONDON, and in DUODALE.

† Durn
Scriptura.

In the Year 1315. we find the Price of Sheep established in such a Manner, as to give us a fair Insight into the Value of Wool at that Period. The Sheep, if delivered shorn, was fixed at Fourteen-pence; if unshorn at Twenty-pence ‡, but we must not extend this Consideration farther than to the Value of the Wool, for it was a Time of Famine.

‡ Still
ling fust's
Chron. p.
72.

From this Period the woollen Trade became an Object more than ever of the publick Concern. Persons of all Nations who could improve the Manufacture of Broad Cloth, were encouraged to come over: and among Numbers brought under great Encouragements from FLANDERS, BRABANT, and ZEALAND; there were some so worthy of the Advantages they received, that they soon set the Trade upon a most respectable Footing Abroad, and upon the most profitable Foundation at Home.

In Consequence of the greater and more profitable Traffick in this Article, the Price rose; and the more Assurances were drawn from it for the State: in EDWARD the Third's Reign, toward the End, we read of Subsidy after Subsidy on Wool: and in RICHARD the Second's Reign more Subsidies were demanded: the Traders complained, and the Matter being candidly examined, it

it appeared that though they were not wholly without Reason of Complaint, yet the Trade could bear additional Loads, and that they might raise Fortunes.

In the Reign of HENRY the Fourth the Sanction of Parliament granted to the King, for a limited Time, a Subsidy of fifty Shillings upon every Sack of Wool belonging to the Natives, and four Pounds on those of Strangers exported; and such was the Produce of Wool in BRITAIN at that Period, and such the foreign Demand for it, that the Quantity exported was not less than a Hundred and thirty Thousand Packs in a Year: and in RICHARD the Second's Time the Subsidy had amounted to a Hundred and sixty Thousand Pounds. This is related by PRYN, and the other Historians, and is supported on the best Authorities.

The same Subsidy that had been granted to HENRY the Fourth, was allowed for four Years in HENRY the Fifth's Time.

In the Reign of HENRY the Sixth we find thirty-three Shillings and Four-pence a Sack allowed to the King on the Natives Property in this Article; and forty-three Shillings and Four-pence on that of Strangers. The woollen Trade increased under all this Demand; and NORWICH about this Time became eminent in it.

In the former Reigns the large Subsidies on Wool had been granted only for two, three, or four Years, in Time of Necessity; but in the Reign of EDWARD the Fourth, the Charge of thirty-three Shillings and Four-pence on the Wool of the Natives, and of three Pound Six and Eight-pence on that of Strangers, even the naturalized, was granted to him for Life.

Even this proved no Check to the Traffick. Enclosures became more frequent; the Land was more improved, the Management of the Cattle and their Wool was better understood; and ENGLAND carried the Praise for this Article before all other Nations.

In the Reign of RICHARD the Third, though the Traffick was encumbered with large Subsidies, it increased continually. In the succeeding Reign of HENRY the Seventh, the greatest Regard was shewn to Trade in every Article, and in none more than this. The Exportation of Wool was limited, and the Manufacture of Cloths increased accordingly.

In HENRY the Eighth's Reign the Produce of Wool was greater than at any Time before; and its Price increased with the Quantity; such was the Demand for it Abroad, and such the Consumption of it at Home. Farmers were laid under certain Limitations, as to the Number of Sheep they were allowed to keep; but these were very extensive ones, and we may see by the Account preserved of this Transaction, and of the Price of Things at that Time, to what an Advance the Care of that Animal, and the Price of its Flesh and Wool, had risen.

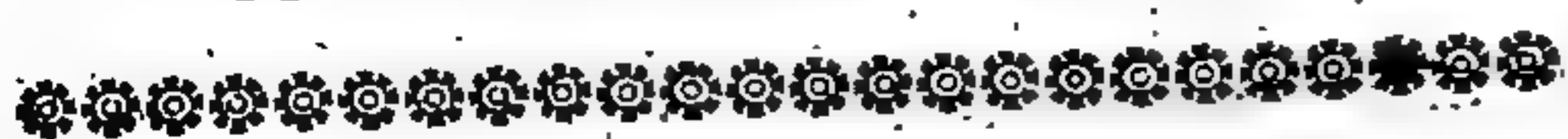
No one was to have more than two Thousand, but this with many Exceptions. The Statute, by way of Reason, recites "The advanced Price of all the Native Commodities in the Kingdom. That some Persons had at that Time vast Numbers of Sheep, which for Victual had risen in Price from two Shillings and Four-pence, or at Numb. 11.

" the most three Shillings, to six Shillings, or five Shillings, or four Shillings at the least; and that a Stone of Cloathing, heretofore in some Shires accustomed to be sold for Eighteen-pence or Twenty-pence, had risen to four Shillings, or three Shillings and Four-pence at least. In others, where it had been sold for two Shillings and Four-pence, or two Shillings and Eight-pence, or three Shillings at the most, it was then sold for five Shillings or four Shillings and Eight-pence the least."

If we look back to the Prices of Wool in the thirteenth and fourteenth of EDWARD the Third, which was near two Hundred Years before, the lowest, viz. the Wools of CUMBERLAND and WESTMORELAND, were sold for above two Shillings per Stone, exclusive of the Duty, which was something more than one Shilling and Six-pence per Stone; and those of SALOP, at better than four Shillings and Ten-pence per Stone, in like Manner. So that in Fact, there seems to have been at this Time, no Advance in the Price of Wool from the Period just mentioned: but very much the contrary, considering that the Shilling was then two Hundred and Sixty-four Grains; and at this Time, but one Hundred and eighteen. Nor was it any Advance from the cheap Price of which H. KNYGTON speaks, because the Shilling was then two Hundred and thirteen Grains. Much less was Wool dearer at this Time, than in the fourth of HENRY VI. The Price being then not only nearly equal to the highest Rate mentioned in this Act, but the Shilling then, at the lowest, contained Twenty-four Grains more than at the Time of the Act; and therefore we are to suppose the Complaint then made concerning the Dearness of Wool, to have had respect to some intermediate later Times, in which the Price of Wool does not now appear; and which was probably occasioned by the Monopolizations of the Merchants of the Staple, and the Manufacturers.

As to the Price of Victual, it will not be amiss to insert here a little Piece of History, which Bishop FLEETWOOD takes from Mr. STOW, in the Year one Thousand five Hundred and Thirty-three. It was that Year enacted, "That Butchers should sell their Beef and Mutton by Weight: Beef for a Half-penny the Pound; and Mutton for three Farthings: which being devised for the great Commodity of the Realm, as it was thought, proved far otherwise. For at that Time, i. e. one Thousand five Hundred and Thirty-three, fat Oxen were sold for Twenty-six Shillings and Eight-pence, fat Weathers for three Shillings and Four-pence, fat Calves for the like Price; and a fat Lamb for Twelve-pence. The Butchers sold Penny Pieces of Beef, for the Relief of the Poor; every Piece two Pounds and a half, sometimes three Pounds. And thirteen, sometimes fourteen of these Pieces for Twelve-pence. Mutton Eight-pence the Quarter, and a Hundred Weight of Beef for four Shillings and Eight-pence. What Price it has grown to since needs not be set down. At this Time also, and not before, were foreign Butchers permitted to sell their Flesh in LEADEN-HALL Market of LONDON." I suppose by Foreign Butchers,

he means such as lived not, or had not served their Apprenticeship in LONDON.



CHAP. XL.

Of the Wool Trade from the Time of HENRY the Eighth.

WE have seen what a prodigious Advance the Wool of ENGLAND made in the several preceding Reigns, and we shall find it in this continue encreasing.

Husbandry had been in early Times but very little understood in ENGLAND, but the Regard to this Commodity, the Demand for which was so considerable, and the Price so large, gave a Spirit to the People concerned in it at that Time, which we wish had been continued to the present.

In EDWARD the Sixth's Reign we seem to have had Farmers in ENGLAND, who understood the Management of Pasture Ground so well, that it were happy if Books had been written on the Subject, which had perpetuated their Improvements. The great Benefit of Enclosures was a little before understood fully, and they encreased in the Reign of EDWARD the Sixth. The Care of the Pasturage grew with the Number of Enclosures, and the thriving of Sheep, and the Price of Wool, with it. That Commodity sold in this Reign dearer than in any of the preceding. Statutes were made from time to time, to encourage the Manufacture of Cloths, and Marts were established by Authority in different Places.

In the Reign of PHILIP and MARY the Subsidies granted to EDWARD the Sixth were continued, only with a Limitation in Favour of naturalised Strangers, or such as should be naturalised. Many good Statutes were enacted in Favour of the woollen Manufacture in this Reign; and it throve greatly under the prudent Regulations that were established, and extended itself to many Parts of the Kingdom.

In QUEEN ELIZABETH's Time a Subsidy was granted for Life on this Article, included in Tunage and Poundage: many good Statutes were made in that Reign, and Numbers of the FRENCH and FLEMISH engaged in the Cloth Trade, leaving their native Country because of Persecution, brought over their Secrets, and encreased our Credit. In this Reign Wool unmanufactured rose from its former Price, which might be called Thirteen and Four-pence to two and twenty Shillings a Tod.

We may safely establish the Period from the End of EDWARD the Sixth's Reign, to the End of QUEEN ELIZABETH's, as the most flourishing of all Times for the Wool Trade of ENGLAND. It has never risen much higher since, and it has very often been much lower; in general, considerably below that Standard.

Yet even in that Time we were far from supplying all the World, or all EUROPE, with Cloth; for there were many other Countries very eminent in the same Manufacture: this therefore, as we have shewn before, is an imaginary Notion, and it is altogether erroneous to suppose we ever did, or ever shall have that vast Trade to our-

selves. It is enough if we can get the Superiority in the Manufactures, which doubtless we may; and we may be very proud of our Success, if we can yearly bring in such Sums as it then raised; which were, moderately speaking, near three Millions a Year.

In the Time of JAMES the First Wool afforded Subsidies, and that largely. New Regulations were made, and Statutes enacted. Monopolies and Oppressions were introduced, but the Clamours of the People got the better of them: the Desire of growing rich too fast became however general among the woollen Dealers, and hurt the Trade extremely: Abuses were committed in the making Cloth; and our Credit in Consequence declined, during this Reign, in foreign Markets. Proclamations were published to prevent the Exportation of Wool, and Search was made into the Nature of the Abuses; but in vain. The Manufacture dwindled, and the Price of Wool fell from Thirty-three to eighteen Shillings a Tod.

The first Years of King CHARLES the First's Reign, promised the Revival of the woollen Trade; but the Disputes succeeding reduced it lower than ever. Proclamations now took the Place of Statutes; and the Exportation of Wool was forbid by several of them.

In 1640. Wool was advanced again to Twenty-four Shillings the Tod.

In 1671. many Attempts were made to restore these Manufactures to their former Glory. The bad Consequences of suffering our Wool to be exported unmanufactured were shewn; and Propositions made for gaining several hundred Thousand Pounds a Year, by throwing that Trade into a better Method: but these were Times in which Men better knew what should be done, than how to do it.

In 1685. the FRENCH began to supply foreign Markets with what they called ENGLISH Cloths. These had been made of ENGLISH Wool, and while that was, in despite of all Remonstrances, suffered to be exported; and so many Disadvantages laid on our Manufactures at Home, it was no Wonder they could under-sell us in the same Articles. The publick Attention was waked by this, the Exportation of Wool was absolutely prohibited, and great Encouragements were given for the Produce of Wool, and for the working it here into marketable Manufactures. This raised the Spirit of the People, and the Advantage was soon seen; happy had it been if the Measures so projected had been as properly continued.

When Wool, except in woollen Manufactures, was prohibited Exportation from ENGLAND, the FRENCH, and other neighbouring Countries, got it from IRELAND; and this was soon seen, and its Disadvantages; and Laws were enacted against it.

In 1703. the woollen Manufactures began to flourish again in ENGLAND: a Treaty was soon after made with PORTUGAL, very advantageous to them; and there was the Appearance of their again making great Progress. The FRENCH droop'd in this Article, for some Time after they were deprived of our Wool; but they found the Way afterwards to rival us, with what they produced

duced at Home, or got from elsewhere; and the Manufacturers with us saw that there was no Way but Integrity in their Dealings, and a Care of the Trade that could give them the Preference.

These great Articles of the Trader's Character, were not found: integrity was wanting in some, and Knowledge or Attention in others; and for several succeeding Years Things, in this Respect, went worse and worse: the Neglect of those most concerned let FRANCE get our Wool again in great Quantity, and our own Manufacturers drooped in proportion: for this has been found at all Times, that although the FRENCH can carry on their Traffick in this Article without us, yet they always succeed best when they have most from us; and we droop in proportion.

To close this important Consideration we must observe, that on two Things depend the flourishing State of the BRITISH woollen Manufacture: on the Care of the Husbandman in the proper Management of his Sheep and their Produce; and on the preventing its Exportation when we have it in the proper Condition. We have laid this short History of the Rise and Progress of the woollen Manufacture before the Husbandman, to spirit him up in this great national Concern; and to shew him that they are idle Declaimers who tell him ENGLAND always must be the Country for the best or largest Quantities of Wool; that he may know how much it is necessary to exert himself in a Concern on which the Welfare of his Country, and his own Advantage so greatly depend.

Having given him this full Detail of the State of the Trade, we shall proceed to the Practical Part; and acquaint him how he is to manage his Wool to the best Advantage. We shall not enter upon a nice Detail of the Manufacturer's Profession, but only lay down the plainest and most profitable Rules for so much of the Management of Wool, as concerns the Farmer: that is, the preparing the great Part for Sale; and the working up the rest at Home, for the Service of his Family.

CHAP. XLI.

Of cleaning, carding, and greasing of Wool.

WE have, in its proper Place, laid down all the Rules needful to the Husbandman for the Choice, breeding, and feeding of his Sheep, and have at large acquainted him with all that is needful to be done in the great and important Article of Shearing.

We will suppose therefore that he has got his Wool from the Backs of his Flock, and proceed to tell him what he is to do with it. The Mistress of the House naturally undertakes the Office of preparing the Wool for her Family Clothing: the Husbandman is therefore to deliver to her such a Quantity as will answer this Purpose, rough from the Hands of the Shearers.

The first Thing to be done with this is to open it with a Pair of Shears, and cut away all the foul Pieces, Knots, and Lumps of whatever Kind. These must be laid by for meaner Purposes, and the rest thus cleansed must be broke

and divided very carefully between the Hands, that there may be none of it left matted together.

When it is all thus clean, loose, and fine, it is ready for carding: but as some will be required white, and other Part coloured, it is to be separated for that Purpose. Such as is for Colours must be divided into different Parcels, according to the intended Dyes; and the usual Way is to keep each Parcel in a separate Bag of netting, with the Weight marked upon it. These are then to be sent to the Dyers, and the Owner will be sure, by this Precaution of the weighing and marking, not to be deceived.

The white Wool as it is, and the other when dyed, are to be wrought just in the same Manner.

The first Operation is carding: and the Intent of this is to mix and blend equally every Part; to tear it open perfectly; and to discover and separate any Knots or Lumps, which may have been so small that they were not observed in the breaking of the Wool by Hand.

This carding should be very carefully performed by Means of a Pair of Stock Cards well fastened to a Form. The whole Quantity is to be over and over combed and carded on these, and the least Knot that is found is to be separated.

When the Wool has gone through this careful Management, it is to be greased. This is done by Means of Oil; and the common Kind of Oil used for the Purpose is the Rape Oil made from Coleseed, which we have before named in its Place.

The Wool is to be spread evenly upon a large flat Bed, and the Rape Oil is to be sprinkled on it carefully with the Hand, till there is enough put on to wet the whole in every Part. Then the Wool is to be moulded and worked about with the Hand; that every Thread of it may be moistened. The best Way is to turn the whole once, or oftener, as the Oil is sprinkled upon it; and by that Means it works in the easier. Every Part must have its Share, that is the great Concern. Yet in the Care of this there must be Regard had to the Quantity of Oil employed: it would be easy to wet the Wool, by pouring on a great deal of Oil at once, but this would spoil it: the Art consists in having every Part really wetted, and yet none too much. This is the Reason of sprinkling the Oil on softly, and turning the Wool often while it is doing; and in this consists the Art of greasing, as it should be; it is of the greatest Consequence, to moisten the Wool well with a little Oil, for on this depends the Perfection of the Web. If too much be used the Thread will not draw, but will fall into very small Pieces.

There is no better Way of being sure of finishing this right, than the trying it at Times as it is doing. When the Wool is greased it is fit for spinning: therefore nothing will be so proper as to have a Wheel by, and try it from time to time. A little Oil should be worked in at first, and then the Wool tried on this Wheel: if it draws dry and breaks, then a little more Oil is to be used; for the Use of this is to keep it moist and supple, and to make it hang together: this Purpose it excellently answers when a small

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Quantity of it is well mixed with the Mass; but as we have observed already, when too much is used, and it is put to the Wool in a careless or unartful Manner, it takes quite a contrary Effect, and the Wool falls to Pieces.

When the Wool, on trying it, draws well and holds together, the Quantity of the Oil is right. The Eye and the Hand will judge of this, when People are very much used to it, but there is no Way so sure as this of Trial. In general Wool requires somewhat less than a third Part of its own Weight of Oil for this Operation. Therefore that those who are not used to the Manufacture may proceed upon some Certainty, let them first weigh the Wool, and to every three Pounds of it allow a Pint of Rape Oil, bare Measure; or to every ten Pounds of Wool three Pints of Oil: let about two Thirds of this be used at first, and then the Wool tried on the Wheel, for sometimes this will do; and if not, let some more of the Quantity be used, but carefully and with great Discretion.

Oil is the common Thing used for this Purpose, but any greasy or fatty Substance will do: and indeed any Kind of Oil. Where Rape Oil was not to be had I have seen other common coarse Oil used; and many a good Housewife has made Hogs Lard answer the same Purpose; but the Oil mixes more easily, and more thoroughly with every Part of the Wool. When Hogs Lard, or any other solid fatty Substance, is employed instead of Oil it must be melted, and very carefully sprinkled on while it is fluid, and mix'd well in by turning and softly working with the Hands.

CHAP. XLII.

Of tumming and spinning of Wool.

THE Wool may, for some Purposes, be spun as it comes from the Hand of the Housewife in the greasing; but the better Way is to use this only as a Preparation for the tumming. This tumming is another carding, and it brings it to a great Degree of Fineness and Suppleness; and makes it fit for all the Housewife's Purposes. The Method of tumming it properly and effectually is this.

When it is thoroughly oil'd or greas'd, and will hang in a Thread from the Wheel, let it be very well worked in the Hands, and then spread out as at first. Let a Pair of long-tooth'd Cards be made ready; and let it be very well carded and combed again, drawing it perfectly fine; and separating every thing that is knotty, tangled, or uneven. These Pieces, thus separated, are called Tumming, from the Name of the Operation; and they are to be reserved by themselves for other Purposes. They are not to be mixed with the first foul Parcel, because having gone through so much more of the Operation, they will be great deal finer than they.

The tumm'd Wool is now perfectly ready for spinning. The Wheels must be large, and a steady and careful Hand must be employed in the spinning it.

There is so much Difference between the Wool

of one shearing and another, that all will not spin to the same Fineness. No Force is to be used in this, for it will not succeed. If any one should attempt to force a coarse Wool to run into a fine Thread, it would never answer in the other Parts of the Manufacture. Things must be taken as they are: and when the Wool is suffered to run from the Wheel well, as it naturally offers, it will be sure to hold good in every succeeding Process.

A judicious Person will see, from the Nature of the Wool, what Service it will answer from the Beginning, but this is not essential; for whether it be formed for a larger or a finer Thread, the same Care is to be taken of it in every Article we have already named. The Difference arises partly from the Breeds of Sheep, and partly from the Care taken of them in their Management; both these Articles we have treated of already, and therefore need not repeat what we have delivered on those Heads.

When the Wool is of a coarser Staple it should not be wrought into a fine Thread, for if this be done it will want Substance when it comes to the Mill; it will beat to Pieces, or never bed well, and consequently the Cloth will have little Strength, and do little Service.

In the same Manner if any one should force a Wool of a finer Kind to spin out into a thick Thread, being against its Nature, it would be greatly to its Disadvantage. In this Case a great Part of the over Thickness of the Thread must be taken away afterwards to waste, or the Cloth will wear coarse.

This is all the Caution required in the common Way of spinning, and the doing it properly and well depends, as we see, principally upon the keeping a regular Hand, and letting the Wool work according to its Nature; but a great deal more may be done by those who are expert. There may be two Kinds of Thread spun; and indeed it always should be so. Two Manners of spinning should make these two Kinds of Thread, which are called the Warp and the Woof.

The Difference is this. The Warp is to be spun close, round, and hard twisted, and it should be strong and very well smoothed: the Woof may be spun more loose, open, and but half twisted. The Reason of this will appear very plainly, when the Farmer considers their Use and Condition. The Thread of the Warp is to run through the whole, and to endure the fretting and beating of the Beam: the Woof, on the contrary, requires no great Strength or Smoothness, because it only crosses the Warp without any Violence or Straining.

It is not only that the Woof does not require the Firmness and Hardness of the warp Thread; but its being looser and softer makes it answer the Purpose better: it beds the closer and evener in the working, and the Warp has all the necessary Strength for keeping the whole together.

The Intent of the Woof is to cover in and unite all together, and this is to be perfected by beating in the Mill. This is an Operation altogether needful to the Cloth, yet the less of it can be made to answer the Purpose the better. Now the proper spinning of the Woof Thread is an

important Article in this Respect. Many a good Housewife thinks she never does well unless she make one Thread as hard as the other, and therefore she orders all the Parcel to be spun alike, thinking the leaving the Woofe thus open to be only a Piece of Idleness. But the looser this Woofe Thread is the easier it is to make it cover, and the less beating it takes; the harder the more. This is an important Article, and has been much disputed, but the Practice in the Cloth Countries, which is founded on long Experience, ought to determine it. 'Tis a common Opinion that the making both Threads hard, though it requires a great deal of beating to bring the Cloth to Form, yet gives it Strength: but this is proved an Error.

The Warp is the Thread on which the Strength of the Fabrick is to depend, and as to the other, its being hard is found to be of no Service. It makes the Cloth fret and wear, whereas the leaving an open loose Thread for the Woofe, gives it a pliable Softness that prevents all fretting and cracking.

We hear every body of late speak of the FRENCH Cloths; they praise them for their Pliantness and easy Wear; and though they are in reality greatly inferior to the ENGLISH in Substance, and many other Particulars, yet People prefer them for this Reason. A Desire of being serviceable to my Country in this great Article, has led me to make Enquiries among those who understand the FRENCH Clothiery, and I find it is altogether owing to their spinning two Threads out of every Parcel of Wool, and keeping one for the Warp and the other for the Woofe, the latter of which they make so loose that 'tis hard to work it. The Consequence is, that a very little beating brings the Cloth into a Body, and when finished it is soft, pliant, and very fit for wear. One would think these FRENCH Cloths, by their Look, and by feeling of them, could do little Service, but the contrary is found upon Trial. They never crack, and the Looseness of the Woofe Thread rising from time to time, keeps them from wearing thread bare. Our hard Cloths are very liable to grow bare at the Seams; these never do; because they are less harsh. They are fitter for Gentlemen's Service than for labouring People; but it would be easy to follow their Practice more moderately, which is what we recommend to the Husbandman, in preparing Cloth for his own Family, and then there would be more Service and more Credit every Way in these Cloths, than in those which are made every Way with a harsh and hard Thread.



C H A P. XLIII.

Of the winding the Thread, and finishing the Work.

WHEN the Wool, after the dressing, oiling, and tumming, is spun into Thread, or Yarn, it is for Convenience to be wound. Those who continue the old Housewife's Practice of spinning it all alike, have nothing to do but to wind it off as it is finished from the Broch, into

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a Clew or round Bundle. But the better Way is, as we have said, to spin it in two Kinds, and wind each off in its separate Clew, the warp Thread and the woofe Thread. In this Condition it is ready to be made into Cloth. The making it up is the Business of the Weaver, a Trade to be learned by an Apprenticeship, not by any Description that can be given in Writing; nor is it our Purpose here, for we limit ourselves to the Business of the Husbandman alone, for whose honest Service this Work is written. However, though we are not to instruct the Weaver in his Profession, yet it will be proper to inform the Farmer so far in the Nature of it as concerns himself; that is, to give him just so much Insight into the Work, that he may know whether he has Justice done him or not.

In the first Place, before the Yarn is delivered to the Weaver, it is fit the Owner should know how much Cloth it may make; I have known an ignorant Person cheated, in this Respect, of half, nay two Thirds, by the Villainy of the Weaver.

The Quantity of Cloth will be very tolerably determined by the Weight of the Yarn. We have advised the weighing of the Wool before, but it will be proper finally to weigh it again, when it is in the Clews; this is very easy, and as there may have been some Waste in the former working, it is the best Method.

The general Computation, in the Language of the Workman, is, that it will run Yard and Pound; and this is in the common Run true, provided the Wool have been originally good, and the spinning carefully performed. If the Yarn be coarse it will make less.

This being determined, the next Care is to observe how many Pounds of Yarn are laid in the Warp, and so many exactly must be reserved for the Weft or Woofe. This is a Rule not universally practised, but there is none better. Even and even is the Practice of the best Workmen, when they have a Mind to make the best Cloth. There may be Differences, but they will be for the worse, at least they certainly will in the Cloths we are treating of, which are the common Kind for the Service of the Family.

If the Owner will carry his Observations farther, it will be so much more to his Advantage: though he cannot do the Weaver's Business, he can know when it is well done; and he should over-look it often, to see that it be so. He is to observe that the whole be woven close and true; and in every Part alike.

From the Weaver the Cloth is to be carried to the Fulling Mill, and there he may see also that the Business be done well and carefully. We have shewn him that some Yarn will make the Cloth require more milling than other: but if this have been spun well in the two Kinds, let him see that it have not more than it requires.

The scouring Earth is the next Article to be considered, and none is of more Importance. It is a most necessary Ingredient, but it may be a very hurtful one. Its Use is to clean, but it may tear the Cloth: its Fineness is all in all on this Head, for if it be coarse, and the Work ill managed,

naged, it may very naturally and easily beat Holes in the Cloth.

From the Fuller the Cloth is to be carried to the Sheerman, and there, if the Eye of the Owner follow it, he will be sure to have it the better done; he is to see that this Workman hurle it, and drefs it sufficiently; and sheer it according to his Purpose: Moderation is the best Rule. If it be left too rough it will not wear clean, and if too close it will be soon thread-bare.

C H A P. XLIV.

Of the dying of Wool.

THE Husbandman will consider in this Place, as in the preceding Chapter, that we are writing solely for his Service, and the Reader who has Candour will not pursue the Subject farther in this Place; nor censure us for having considered it thus far. We do not intend to teach the Art of Dying, any more than we attempted before to instruct our Husbandman in the Trade of Weaving. We only aim to give him all the Information that may be needful; and to lead his Curiosity no farther. We have, in the last Chapter, told him how he is to judge of the making up of his Cloth; but in this we shall proceed a little farther. We shall not enter into the Business of the Dyer at large, but shall shew the Countryman how he may, in those Instances that serve his common Purpose, tinge his Wool at a small Expence, and do in a Manner all within himself.

The Colours the Countryman will desire to give his Wool, may be reduced to a small Number. Black, red, blue, green, and yellow, may be named as the five Principal, and if we add to these a pale Purplish, an ash Colour, and Hair Colour, from one or other of these, and the Mixtures composed, as we shall shew from these variously combined, he will draw all the Variety that he desires.

For blue, grind in a Mortar a Pound of Indigo-blue, and mix it with two Gallons of stale Urine, set it on the Fire, stir it well together, and put in the Wool when it is made moderately hot. Let it continue some time, and it will have a good strong blue Colour.

The Quantity of the Ingredients must be proportioned to that of the Wool; and the best Time for dying it is before the oiling.

To die black beat to a gross Powder two Pounds of Galls, put them into a Pot with two Gallons of River Water, put to them one Pound of common green Copperas, boil them up well together, and the Liquor will be like Ink. Put the Wool into this and boil it. Then let it cool, take it out, and hang it to dry.

To dye red set on a Quantity of River Water, in a large Earthen Vessel. When the Water is scalding hot put in a Peck of Wheat Bran: let this boil a few Minutes, then pour it into a Tub, and put to it twice the Quantity of cold Water. Set this by for a Week. Then weigh the Wool you intend to dye red, put it into the Water and Bran; and with it, to every ten Pound of the Wool, one Pound of Allum. Let these

boil together an Hour: then take out the Wool: Beat to Powder a Pound of Madder Root, put it into Bran and Water, and when it is hot, and the Madder is well mixed with it, put in the Wool, break and divide it well with the Hands; and when the Liquor is so hot the Hands cannot bear it, stir it about with a Stick; when it is well coloured take it out; and hang it up to dry.

To die yellow boil the Wool in Allum Water, made as strong as before directed; then take it out, and hang it to dry. Set on a large Pot with River Water, and a good Quantity of Dyer's Weed, of which, as also of Madder, we have spoken in their Place. Put the Wool into this, divide and break it well, that it may receive the Colour throughout, and it will thus become of a very good strong yellow.

To die green, the Husbandman's best Method is first to die his Wool blue, as we have directed already: when it is dry in this Colour let him set on a Pot of Water with Dyer's Weed, and put in his blue Wool. It will receive the Die in the same Manner as the other, and by a natural Consequence the Wool become green; because a Mixture of blue and yellow is always green.

To die a pale Purple the same Ingredients are to be used as for dying black, only in less Quantity, and in a different Management. The black is only a purple carried to that Extremity. This is plain from Experiments easily tried. The same Ingredients that make this black Die make Ink, and they will always make purple instead of black in a smaller Quantity. If Copperas be dissolved in Water, the Liquor will be clear. Then let Galls be boiled in Water, and some of that being dropped into the other it will raise a purple Cloud, and when more is added it will be darker, till it become quite black. In the same Manner this Die, which is for black in the common Way, may be made to answer for a pale Purple. It is to be done thus.

Bruise some Galls to a coarse Powder, set them over the Fire in a Vessel of River Water, and when the whole is hot put in the Wool. Let it boil half an Hour, then take it out and hang it to dry. The Colour of the Wool will be scarce at all altered by this. Let the Liquor be poured off clean from the Galls, and put to it a smaller Quantity of Copperas than is ordered for black dying. The Liquor will instantly become black. Draw the Wool lightly through it; and it will get a pale purple Tinge. If it be not deep enough put it in again. The Care must be not to make it too deep.

To die Hair Colour set on a Pot with strong Allum Water: boil the Wool in this, and then take it out.

Then mix together a good Quantity of Soot and Urine; and when they are hot put in the Wool. Let it remain a moderate Time, then take it out and hang it up to dry. This makes a very good, serviceable, and lasting Colour.

To die Ash Colour make a Liquor in the same Manner as for the pale Purple, but instead of putting in the Wool boiled only in Galls, use Wood died red, as before directed, with

with Madder. This will make a very pleasing Ash Colour, with a light Glow of the red, which will be very agreeable.

We have thus laid before our Husbandman the Method of dying all the useful plain Colours, in an easy and cheap Manner; and shall, in the same Way, shew him how to make a Variety of Mixtures in his Cloth from these simple Dyes in the Wool. The Dyers use more laborious Methods, and more expensive Ingredients; but this is sufficient for all the Purposes of the Country Farmer.

We have directed the Wool to be dyed before the spinning, which is by much the best Way; and in treating of the mixed Colours for Cloths, in the next Chapter, we shall pursue the same Method, ordering them to be made from the loose Wool thus dyed; nevertheless, if any chuse it, they may in the same Manner, and with the same Liquors, dye the Yarn or Thread after it is spun, or even the Cloth after it is wove. Circumstances may sometimes render this Management necessary, though the other is preferable.

C H A P. XLV.

Of mixing the coloured Wools for weaving.

OUT of the plain Colours we have directed the Farmer to die, it will be in his Power to make several Mixtures, and those for Service are frequently better than the simple Colours themselves. The Time for doing this is when the Wools are dry, and before they go through any other Operation. Indeed nothing prepares them so well for spinning; for nothing renders them finer than the necessary Division of them in the mingling of their Colours.

If the dy'd Wool be intended to be wrought up in its plain Colour, it is to be treated exactly as the white in all Respects, oiling, tumming, and the like; therefore nothing on that Head need be said farther: but if it be intended for Mixture, that is to be made before any thing else is done to it.

Mix'd Colours may be comprised under two Heads, those which are composed only of two, and those composed of several.

Of the first Kind the best are those made up of the darkest and the lightest or brightest Colours, for these give a Spirit: whereas two light, or two dark Colours together, make no considerable Variations.

The Proportions of the several Colours in these Mixtures, may be varied in a Manner without End; but there is one Proportion which is in general better than any other, and is therefore worthy to be advanced into a Kind of fixed Rule. This is when a proper light and a proper dark Colour are chosen, to weigh two Pounds of the dark, and one of the light, for the Mixture, and in the same Manner for any larger Quantity, the bright Colour being only one third Part of the whole. Thus if we suppose blue and red to be the two plain Colours, of which a Mixture is to be made, and the whole Quantity intended to be used to be fifteen Pounds; in this Case there

should be ten of the blue and five of the red; and so in all other Cases.

The Colours thus produced are what are called mixed Colours in a distinct Manner; for when more are used they are called Medleys; and the Way is this. Suppose three Colours for Instance are to be mixed, if two be dark and one light, the Method is to take an equal Quantity of each of the light Colours, and twice the Weight of both the others, of the dark one; on the other Hand, if it be a Medley of two dark Colours and one light, then an equal Quantity of each is to be taken, and they are to be perfectly well mixed together.

When the Wools of these several Colours are weighed out, a large Sheet is to be spread upon the Ground; and upon this is to be spread an even and thin Layer of the darkest Colour, or of one of the dark Colours, when two are equally dark: upon this is to be spread another Layer of the lightest Colour, and so on interchangeably Layer over Layer, till the whole Quantity of Wool that was weighed is spread on the Sheet.

Then this Wool is all to be rolled up into one thick, hard, and stiff Roll. The Way is to begin at one End, and carefully turn up the Edge round itself. This makes a Beginning, and the rest all rolls upon it very easily; a steady Hand is to be used, and the whole will be thus brought into one long thick Mass.

One End of this Roll is then to be made fast in a Frame, or a Person is to kneel upon it, to keep it from moving or untwisting, and beginning at the other the whole is to be pulled out into small Pieces. The spreading and rolling of the Wool had before very tolerably mixed the several Colours, but this does it entirely; the whole will now be an uniform Mass of a medley Hue, as if dyed of three or more Colours together.

When this is done the Wool is all to be carded and combed together, by a Pair of Stock Cards well fixed to a Form.

This compleats the Mixture, it grows into an even and perfectly uniform Mass; and if there be any Knots or Lumps in it they are to be carefully separated.

This combing is to be done exactly in the same Manner as in the Management of white Wool, before described; and after this the oiling, tumming, spinning, winding, and warping, are to be performed in the same Manner. The Cloth thus made has a very good Look, and wears clean: none is fitter for the Service of the Family.

The Farmer or his Wife may thus, without farther Information, perfectly well go through so much of the Wool-Dressers and Dyers Business as is necessary for their own Concerns, and in Places where those Trades are not at Hand it is a very great Convenience to be able to supply their Places at Home.

C H A P. XLVI.

Of Hides and Leather.

THE Wool being disposed of either at the Market alone, or partly at Market, and partly wrought up for the Service of the Family, the

the Care of the Hides of Sheep, Oxen, and other Beasts remains, and is the Farmer's next natural Consideration.

Hides are of various Kinds, according to the Creatures from which they are obtained; and they are accordingly put to various Uses: and they may, like all the Farmer's other Products, be sold by him either rough, or with some Degree of Preparation. The entire Dressing of them is the Business of a distinct Trade, or indeed, taking in the whole Course of the Subject, of several Trades; however, it is proper he should know so much of the intended Operations, as to be able to suit his Hides, as far as lies in his Way to them.

The Skin of the Cow and Ox Kind is so much above the others in Use, that it has, in a Manner, appropriated the Word Hide to itself; those of these Creatures being called, in the common Way of speaking, Hides, and those of other Animals Skins.

The Farmer usually sells his Oxen or Cows alive at Market, or to the Butcher, and has no farther Care about them; but it may happen that he have Occasion to kill them sometimes himself. The Hide then is sold separate. If he dispose of it just as taken off from the Carcase, it is called a green Hide or a raw Hide: but this is generally the least advantageous Method of disposing of it, because the Purchaser knows it will spoil upon the Farmer's Hands, if he does not know what to do with it farther, and therefore that he will take what is offered for it.

We shall prevent this Imposition upon our Husbandman, by acquainting him what may be done to preserve it.

In the natural Course of Things a Hide will keep a great deal longer in Winter than in Summer. Those who deal in them largely are forced often to keep them some Time; or to send them to a considerable Distance before they are wrought. And in this Case they have a Way of preserving them with Salt: this is in the Farmer's Power, as well as theirs: the Hide will not be at all damaged by it, and he may preserve it thus to a better Market.

A good Quantity of common Salt is to be mixed with a tenth Part of its Weight of Allum beat to Powder. The Hide is to be spread upon a Floor, and a stout Fellow is to rub and work this in well with his Hands all over it, and particularly where there are any Crevices, or thicker Places than the rest: when it is thus well salted it may be kept some Time. The best Method is to double it up, and lay it on a Shelf in a Cellar.

This will answer the Purpose of keeping it some Days; but if a longer Preservation be required, for the getting a Number together, then

two Days after this first salting let it be spread out again and rubbed well with Salt and a little Salt Petre. A Hide will thus be preserved any reasonable Time.

Hides may be preserved dry in the Hair, by carefully hanging them up single in an airy Place, wiping them frequently and turning them till they harden: and in this Way they will be in the same Manner capable of being put to use; but it is not nearly so well as the other.

The Buffaloe Hides from some Parts of AMERICA, are sent over in this Manner, and are dressed afterwards.

The Hides of the Cow and Ox Kind fall into the Hands of the Tanner afterwards, for tanning into Leather; but those of other Creatures, both here and in other Parts of the World are dressed by other Trades, for different Purposes. Shagreen is a Skin prepared in a particular Manner; and Parchment and Vellum are also Manufactures of Skins.

The Skin of the Sheep is the proper Material for making into Parchment, though in some Places Goats Skins are used for the same Purpose.

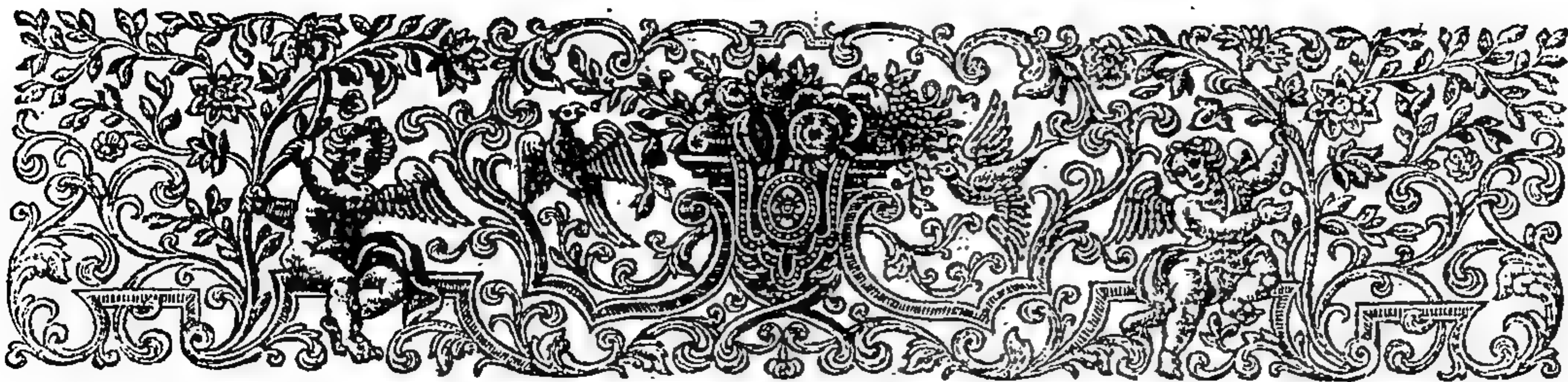
Vellum is made of the Skins of sucking Calves: and Shagreen of the Skin of the Buttocks of an Ass. This last is a Manufacture of the East.

Chamois, or as it is commonly called, Shammy Leather, is made of the Skin of a particular Kind of Goat; but it is commonly in ENGLAND no other than Sheep Skin dress'd in a particular Manner.

The Skins of Sheep and Calves dressed in other Ways, make also Leather of various Degrees of Value for the covering of Books, and other such Purposes: the Calf Skin being always much more valuable than the Sheeps.

The Farmer sees here what are the Uses of his various Hides, and will know by this general Account, that he need not want Purchasers for all Kinds. The Principal, which are the Hides of the Ox Kind, go to the Tanners for making into Leather; and he is ready to receive them in either of the three Conditions we have named, that is, green, salted, or dried. He throws them into Pits with Lime, and Oak Bark, and by that Means takes off the Hair, and hardens the Skin for the various Purposes. The Tanner, when he has gone through his Business, delivers the Hide to the Currier, who finishes the Preparation and delivers it for Use.

We shall not attempt to inform our Husbandman in these Particulars; they are separate Trades, and never can fall within the Compass of his Practice. All that he can be required to know is how, to whom, and in what Manner to dispose of the Skins and Hides, which we have shewn him, with their general Uses.



A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK XI.

Of making Beer and Cyder. In TWO PARTS.

PART I. Of MALT LIQUOR.

CHAP.

8. *The Advantages of Brewing at Home.*

PART II. Of CYDER.

9. *Of chusing a Spot for an Orchard.*
10. *Of disposing the Orchard.*
11. *Of making the Plantation.*
12. *Of the common Management in the making of Cyder.*
13. *The Reverend Mr. GEORGE TURNER'S Method of making Cyder.*

CHAP.

1. *Of making Malt.*
2. *Of the drying of Malt.*
3. *Of the several Kinds of Fuel used in drying of Malt.*
4. *Of the right Management of Malt, and of Additions to it.*
5. *Of the several Kinds of Malts and Waters.*
6. *Of Brewing in general.*
7. *Of Brewing in private Families.*

The INTRODUCTION.



IN this, as in the preceding Parts of this Work, we shall lead the Husbandman in the Road of Reason and Experience: considering what has been written as it deserves; and much more

what has been practised as it has come to our Knowledge: we shall begin from the Foundation, that he may be acquainted with every Part, and understand every thing that is directed to be done from the making of the Malt to the brewing and fining down of the Beer in its different Kinds, and for its several Purposes.

BOOK XI. PART I.
Of MALT LIQUOR.

CHAP. I.

Of making Malt.

MALT is a Preparation of Barley, fitting it for impregnating Water with its Taste and Qualities, in the most pleasant, wholesome, and advantageous Manner.

We shall not trace the Subject farther back than to the thrashed and cleaned Barley, in this Place; because we have brought that Grain from
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the Seed to the perfect Corn, in a due Course of Husbandry in a preceding Part. Only we shall add, that as the best Barley will always make the best Malt, so there is an Advantage also in its having grown on a proper Soil, and in its having been dried by a right Management. On these two Articles depend the Quality of the Malt. In general that Barley which is tenderest and most mellow, is best for the Purpose; that which is hardest is worst.

The Manufacturers call this last steely Barley, and they always avoid it as much as they can, knowing it will give them most Trouble, and succeed the least in the Brewing.

It would not be of much Consequence to the Generality of those who brew, to acquaint them with the Advantages of taking the Grain from a proper Ground, and drying it in a proper Manner, for the mellowing of its Substance; because they cannot know those Things, but must receive it as it comes: but we are here writing to the Farmer, who is to make his Malt from Barley of his own growing and drying: he therefore may chuse such of his Grain in this Kind as will be sure to answer best for this Purpose.

The best Barley for making into Malt is that which has been raised on a chalky Soil, and the worst of all is that which has grown on Clay. The Difference, in this Respect, is greater than any would conceive that have not tried it, the Barley that has grown on Clay being naturally hard, and the other naturally tender.

As every Farmer will not have chalkey Soils among his Grounds, we are to tell him in general, that the toughest and stiffest Lands yield the worst Barley for Malt; and the lightest and mellowest the best. Therefore let him remark such as grows on the lightest Soil he has, as fittest for this Use.

When he has fixed upon the proper Field of Barley for this Purpose, let him see it be managed according to the Design. Good Malt requires that the Grain be full ripe, and perfect in the Ear. It is a common Piece of Neglect to mow Barley at random, often before it is ripe: in this Case the Corn is lean, and will never yield a rich Malt.

When it has stood to a proper Degree of Ripeness for mowing; it must be carefully dried after cutting: for if it be housed before it is properly seasoned, it will contract an ill Taste, and will make poor Malt, beside that it will give a great deal of Trouble in the making; not coming, as they express it, so regularly as other better Grain. The Barley being thus far properly managed, is to be thrashed and carefully cleaned, and then it is ready for malting.

Making of Malt is no more than softening and mellowing the Flour of the Barley, and then properly drying it. It is mellowed by Means of Water, and it requires a different Time of steeping for this Purpose, according to the Nature of the Grain.

Such a Quantity as the Farmer intends to use for this Purpose, is to be put into a Leaden Cistern, or other Vessel, and Water is to be poured in till it be six Inches deep above the Grain. This will allow for the swelling, and this will do the Business in two or three Days, according to the Nature of the Grain; the finest Barley always taking the Water the most kindly. In order to know when it is steeped enough, a Grain is to be taken out, and held end-wise between the Thumb and fore Finger, pressing it gently. If it be hard and stubborn it is not steeped enough. When it is in right Order it will yield and give Way a little; there will be a Softness perceived in the floury Part or Body of

the Grain; and the Husk will start or part a little from it: this shews it is just in right Order.

The hitting this Time exactly is the nicest Part of the Art of Malt making: for if it be not steeped enough it will not answer well in the rest of the Process; but will give great Trouble, and make imperfectly; and on the other Hand, if it be steeped too long it will lose its Flavour and its Strength: the Beer that is made from it will have a Deadness from the first, and no Quantity of the Hops will make it keep well.

When the Barley is in this right Condition, the Water is to be drained from it, and it is to lie to come on the Floor: this it will do in a little more than twelve Hours, in favourable Weather, but sometimes it will be twice or three Times as long.

From the Cistern it is to be put into a square Hutch, and there it is to lie quiet about thirty Hours. Then it is to be worked Night and Day, in one or two Heaps, as the Weather is hot or cold, and turned about once in six Hours, the outer Part inwards, and the Bottom upwards; always keeping a clear Floor, that the Corn lying next it may not be chilled.

This Care is to be continued till the Malt begins to spire, or, as the common Expression is, to come: after this it is to be turned once in three or four Hours; and as it comes more the Heap must be spread wider and thinner, to cool it. The best Method is to lay it out in general in Parcels two Foot and a half thick, and about ten Foot broad, to come and chip gradually, for it should neither spire too much nor too quick.

When it is come enough it is to be turned once in two Hours or less, for four and twenty Hours together; and when it is fixed, and the Root begins to be dead, it must be thickened again, and often turned and worked about, that the growing of the Root may not revive.

A diligent and industrious Man is to be employed for this Purpose, and he should be without Shoes for fear of damaging a great deal of the Malt. He must be careful to turn it frequently and thoroughly, and keep a clean Floor: for if he be remiss in the Management at this Time, the Malt will either mould or shoot out in Leaf. This last is the most common Accident attending ill Management at that Time of the working; and it is what the Malsters call acro-spiring. In this Case the fine Flour of the Malt is exhausted in this useless Shoot, and the rest is a Kind of Chaff.

When the Malt is so turned as that the Danger of both these Accidents is over, it may be put into the Kiln; but a better Way is to throw it up into a large Heap first; in which, being in no Danger of shooting, it may lie twelve Hours, which will mellow it in a surprising Manner. After this it should be spread and turned once in six Hours, and this repeated four Times.

The Weather is a great Article to be consulted in Malt making, and its Changes make so great a Variation in the Process, that no fixed Rule can be established. Twelve Hours is about the Time it usually requires to mellow in this Heap, but sometimes an Hour or two less, and some-

sometimes an Hour or two more will be better; the Intent is, that it should mellow kindly without heating too much, and this must be tried by examining it; for if it heat too fast it will be greasy and of little Value. In the same Manner all the other Times of turning must be varied according to the Temperature of the Air. The Farmer sees what is the Intent and Design of the Work, and he is to turn it an Hour sooner, or an Hour later on any of the Occasions we have named, according to the Nature of the Opportunity. If he make his Malt himself this is a very material Part of Knowledge, and, as in other Occasions, if he do not, it is fit he should understand every Part of the Process, that he may know whether those to whom he puts it to be made do him Justice.

When the Malt is in the Condition we have named, it is to be brought to the Kiln, there to be dried according to its Nature.



CHAP. II.

Of the drying of Malt.

THERE are various Degrees of drying Malt, according to its intended Use; and different Contrivances for the doing of it.

In general the paler the Malt is to be, the more gradual and gentle must be the drying: this is the general Rule, and in this there is to be a great deal of Variation. The palest Malt will require ten Hours or twelve in drying, whereas the brownest will be very well dried in four, and a middling Kind in six or seven Hours.

There is a great deal of Variation in the Opinion of Malsters, about the Thickness the Malt should lie upon the Hair Cloth for drying. Our Ancestors were so careful they spread it very thin, they rarely let it lie at more than three Inches deep: our late Improvers, as they call themselves, lay it six Inches or more; but this is a very great Error.

By all that I can see from repeated Trials, about four Inches is a proper Thickness: and in this Manner about a Space of fifteen Foot square will dry two Quarters of Malt.

It is not to lie here all the Time quiet. It must be turned upon the Hair Cloth as upon the Floor, and this more or less frequently, according to the Nature of the Fire, and the Time intended to be allowed for the drying. If the Fire be gentle, and 'tis a pale Malt, that is to have ten or twelve Hours on the Hair Cloth, then once in four Hours is very well for the drying: if it be a Kind that must dry quicker, once in two Hours will be a proper Method: observing in this Case, as on the Floor, to keep a clean Bottom.

When the Malt is sufficiently dried, whether by a quicker or a slower Fire, it must be thrown off from the Kiln to the Floor, and spread thin and wide in an airy Place, that it may perfectly cool. Then it is finished and fit for Use.

There is not, in all the common Arts of Life, any that requires so nice a Caution as the

making of Malt. The Time must be considered: three Weeks is a moderate Allowance, often it will take much longer.

As different Lengths of Time are required for the drying the different Kinds of Malt, there have been also invented various Ways of doing it. The Iron-plate Frame, and the Tile Frame, both full of small Holes, are much esteemed by many; others prefer the Brass-wire and others the Iron-wire Frame; and others the Hair Cloth: the Husbandman is not to give his Voice in Favour of any one of these in general Terms; but to consider the Use it is intended to answer: the Nature of the Malt to be dried is a material Consideration, for that Kind will do for one that will not for another; and when the most expeditious can be used, without Hurt to the Malt, there is something worthy Consideration in the saving of Fewel.

Those which do with the least Fewel are the Iron-plate Frame and the Tile Frame: they were invented for this Purpose, and are a ready and cheap Method. They dry the brown Malts very well, but they will by no Means answer for the pale Kinds.

None of the Methods heat the Malt so violently as these, the Corns often jump like parched Pease, and crack: but they get a fine brown. It is a cheap Way of drying; but let the Farmer see he is not deceived in it, especially if he be to buy Malt of this brown Sort. The Nature of it is to look dry, and it is not the worse for that; but those who sell it, frequently sprinkle Water over it, which it receives freely, and this makes it swell up vastly. 'Tis fairer to the Eye, but this is a Trick that takes away a great deal of its Sweetness.

People find the brown Malt dried this Way apt to spoil in keeping: but they accuse the Machine when the Malsters are in Fault: all the Damage they find in the Malt is owing to the sprinkling Water over it; which they are apt to do on all Occasions, to make their Work appear well; and this subjects it to decay in keeping. Brown Malt, dried on one of these Frames, will keep as well as any, if it be spread to cool as soon as made, and no Tricks be play'd with it.

All the real Damage it is subject to is, contracting something of a Bitterness by burning; and this owing to the Carelessness of the Maker, more than the Fault of the Frame.

This Carelessness of some, and the Tricks of others, have brought these Methods of the Plate and Tile Frame out of Fashion, but without any real Cause. They are fit only for brown Malts in their Nature, but in a fair and proper Management they dry these as well as any other of the Methods, and much cheaper.

The Wire Frame comes next in Degree after the Plate and Tile ones, and it is generally used in their Stead. This dries the Malt more gently and leisurely; but there is some Difficulty in the turning it, and cleaning the Bottom.

Of all the Methods that have been invented, the plain and simple Hair Cloth is the best for nice Work, and the finest Malts. A slow Fire under this dries it very gradually and equally, it is easily turned as is required, and when it is done there is no Difficulty in getting it

it out, for 'tis only turning it at once and all is clean and clear.

CHAP. III.

Of the Fuel to be used in drying Malt.

WE have shewn the Farmer by how many several Ways Malt may be dried in Respect of the Frame, and there is also a great Variety in the Article of Fewel, which he must consider in the same Manner: some Kinds being cheaper, some dearer; and some better, others worse. However this is not so absolute a Character, but that some of those which are bad for the drying certain Sorts, may be very proper for others.

The principal Kinds of Fewel, including the Practice of the several Parts of the Kingdom, are five: 1. Coak; 2. Welch Coal; 3. Straw; 4. Wood; and 5. Dry Fern or Brakes.

The Farmer will understand that what is to be done by this Fewel is to dry the Malt, and nothing more. No Flavour is required from it, and therefore the purer the Fire is, and the cleaner the Malt is dried by it the better.

All Smoak must be wrong upon that Consideration; and therefore all those Fewels that yield a great deal of Smoak, are to be rejected in the drying at least of the nice Malts.

Upon this Consideration the Farmer will perceive, that Fern must be a very bad Fewel for this Use: and at first Sight a Person might join Wood and Straw under the same Denomination, because of the Quantity of Smoak that rises from them in burning: but there is in this a Difference. All Smoak is an Enemy to Malt; but there are Varieties, and those very great ones, in the Taste and Flavour of the Smoak of different Materials. Thus the Smoak of Fern is not only very plentiful, but of a very ill Hogoe, which it will communicate to the Malt. And on the other Hand, the Smoak of Straw, though almost as plentiful as that of Fern, is so sweet, that it scarce does the Malt any Damage. The Smoak of Wood is of a middle Nature between both, not so sweet as that of Straw, nor so rank as that of the Fern.

Thus dividing our Fewel into two general Kinds; the Coak and Welch Coal being the best; and the Straw, Wood, and Fern the inferior, we have here the Degree of Goodness of these latter three; the Straw is the best of them, the Wood the second, and the Fern the worst.

There never can be a Necessity of using Fern on this Occasion, therefore it ought wholly to be excluded from the Malt-house. As to Wood it may always be had, and must be better than Fern; and for some of the ordinary Malts it is a cheap Fewel, and answers very well. Straw, with good Management, may be made to do for any but the very best and nicest Kinds.

With Respect to the other two Coak is the best; but the other is very good.

We advise the Husbandman to use Coak, if it is to be had; but let him see that it be good and well made: for otherwise the inferior Fewels may do better. Fine Coak is made of large

Pit Coal charr'd, or burnt to a Cinder. It is to be burnt till all the ill Smell is consumed, and no Smoak rises from it; and in this Condition it makes the steadiest and the sweetest Fire of any Fewel whatever. It is a common Negligence to char this Coal imperfectly, but the Husbandman who dries his own Malt should examine strictly into it; for one smoaky Piece will do vast Damage. He may see this by the Eye, for there is a particular dry Aspect which Coak has when perfectly burnt, that is wanting in such as has any of its gross Parts remaining.

The next to pure Coak is Welch Coal: this is called by many Culm. It is a fine sweet Coal dug naturally out of the Ground. It comes in thin fleaky Pieces, and burns to white Ashes with a little Flame, and no Smoak, or very little. This brings it nearer to the Nature of Coak, but it is not altogether so pure: however, it is cheaper in many Places, and for all but the fine Malts will very well answer the Purpose.

Therefore let the Farmer, if he have Convenience, dry his own Malt, for out of this Variety of Materials it is possible the Malster to whom he puts it may chuse the worst: in some Places it will not be worth while, because every thing must be built for it, and that the Farmer may not think this proper, when he has a small Family: but in other Places most of the Conveniences will be ready.

In the Hop Countries the same Kiln that dries Hops will dry Malt; and so on many other Occasions: and wherever it can be done 'tis much best for him to do it at Home. As to a little Expence, let him consider 'tis a thing for which there is a constant Demand.

I shall offend the Malsters; but I must add, that if he knew their Practices as well as I do, he would see more Reasons than are here set down for doing his Business himself.

CHAP. IV.

Of the right Management of Malt, and Additions to it.

WE have observed, that to have perfect good Malt the Barley must be in perfect Order; and in this Respect the sweating in the Mow is a great Article. Nature intends some such Practice in the finishing of all vegetable Juices. We find that Apples carried from the Tree to the Press make a poor raw Cyder; and 'tis the same with the Barley: as the Apples must lie in a Heap, the Barley must be packed some Days in the Mow. I have known some Farmers, to save Trouble and Time, thrash their Barley from the Cart which they intended for Malt; and I have shewn them the Effects of their Error. The Malt has been poor, steele, and hard, in spite of all the Care in making; and no Art whatsoever could brew good Beer with it.

Pure Malt requires no Addition for the making of fine Beer, but Fancy or Curiosity have led People to make it various Ways, and some not amiss.

A small Quantity of Oats are added by some: but 'tis a Practice I cannot approve. The first

Invention of this was owing to a Suspicion of the Malster. A Farmer who had been careful of his Malt Corn would put in the Oats, that it might not be changed: and as a very small Quantity answered for that Purpose, there was not much Harm. But when those who did not understand the Reason of it came to put in more by Way of an Improvement of the Drink, the Error was soon seen. As to this Practice all to be said is, Oats hurt the Malt; so the less of them the better; but so much as will answer the Purpose of preserving it to the Owner, may be done without any great Harm.

Others mix Beans or Pease with their Barley for malting. This seems a more unnatural Addition, but I have known it answer very well: such a Kind of Malt, supposing it to be well made, and of a very good Barley, will make a mellow Drink than any other.

A very small Quantity answers the Purpose of this Addition, a Peck and half of either is enough for five Quarters of Barley; and Pease answer the best. The Taste and Qualities of both are much the same, but the Pease come better, and mix more conveniently with the general Quantity.

Though the Farmer may thus make some Additions to his Malt, he must be very careful that none are made by Accident for him. We have spoken at large of cleaning the Corn, in a preceding Part of this Work, and shall observe to the Husbandman here, that there is no Occasion which requires it to be so perfectly pure as this of malting.

The Seeds of many Weeds will get in among it, and some of these are very hurtful. 'Tis said the Seeds of Cockle give the Beer an intoxicating Quality, and in some Places Melilot is a common Weed in Corn-Fields. This is a most mischievous Addition to Malt Corn; for the Seed of Melilot is a very ill tasted, and a very strong tasted one. It gives a disagreeable Flavour to the Beer, and no Art can remove it.

Tho' Oats mixed with Barley hurt the common Kinds of Drink, yet they may be malted alone, and will make a very pleasant Liquor; what is called Oat Ale, where genuine, is made of them, and it is then a soft and mellow Drink, not strong, but very pleasant.

Malt may also be made of Wheat, and a very strong and very fine Kind of Drink is to be brewed from it: but this is a Concern the Farmer has no Business with.

Whichever Way Malt is made it answers the same Characters, if the Work have been well performed; and there are Methods of knowing by Trial, whether it be well made and in good Order or not. 'Tis fit our Farmer know them, that he may be able to try both his own Malt, and that he buys.

A fine Malt should be full of Flour, mellow within, thin skinned, and of a pleasant Smell. The surest Way of trying is by biting a Corn of it cross-wise.

Another very good Method is to try it by Water. This Trial depends upon the following Principle. Barley, in its natural State, sinks in Water; but malting, when it is well done, makes

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it so light that it swims. Therefore to try whether it be well made, let some fine whole Grains be picked out and put into a Glass of Water. If the Malt be mellow they will swim, if but imperfectly made they will sink like raw Barley. The Corns must be perfect for this Trial, otherwise the Water will get into them, and they will then sink, though ever so good.

The Lightness in the Hand is also a good general Way of trying: and also the drawing it carefully across a Board; for good Malt will mark it white.

The Farmer will, by these Instructions, know how to make or buy good Malt, and we shall now tell him how to use it:

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## C H A P. V.

### *Of the Kinds of Malts and Waters.*

**T**O lead the Husbandman on to the practical Part of brewing, we shall first lay down a few Hints respecting the Nature of the Ingredients. Malts, supposing the Barley to have been equally good, may be divided into three general Kinds, from the Method of making: these are, the Pale, the Amber, and the Brown.

The Pale has a great deal of Time, and a very gentle Fire in drying; the Amber has a middle Degree of Fire, and a moderate Time; the Brown is the quickest dried of all.

The Pale is the richest, and it sells for the best Price: it may be brewed with Well Water, but the others require such as is softer.

The Amber is an excellent Kind of Malt; and the best Way of brewing it is with a Mixture of hard and soft Water.

The Brown is the highest dried, and requires River Water.

These several Kinds of Malt may be dried with any Kind of Fuel, because it is only moderating the Degree of the Fire, according to their intended Nature; and it is always best to give the sweetest to that intended to be the finest Malt.

Pale Malt should, for this Reason, always be dried either with Coak or Culm, and the first is much the best.

The Amber may be Straw dried, but 'tis not nearly so well. As to the Wood and Fern they are used in some Parts of the Kingdom, and Custom makes the People relish the Beer brewed from such Malt; but to a Stranger there is a most nauseous Taste of Smoak in it.

The common Practice is to brew some one Kind of Malt alone; but the mixing half Brown and half Pale, is a Way to make a very sound, pleasant, and wholesome Drink.

With Respect to Waters they may be ranked under four Kinds, Spring, River, Rain, and Pond. We have observed that Spring Water is very proper for the pale Malts; but let it be such as is pure. There is a great deal of Spring Water impregnated with various Substances, as Salt, Alum, Iron, and the like. All these are improper for the common Service of Brewing. Some use them indeed for Medicinal Purposes, brewing Drinks with them that it may have



have their several Virtues, but this is not what we speak of here. We are informing the Farmer how to brew good Beer, and not how to make Medicines.

River Water is in general the best of all for Brewing: but to be in Perfection it should be such as is not near the Head of the River, because that will be of the Nature of Spring Water; nor near great Towns where Filth is thrown in: and to be nice in having it in the greatest Perfection, it should not be used after great Rains when it is thick and muddy.

Clear River Water is soft, and the finest of all: it is naturally pure, as rising from a Spring, and it has been softened by its Motion, and by the Effect of the Sun and Air.

River Water in general takes out the Virtue of the Malt better than Spring Water; and the Difference is so considerable; that about one seventh Part more Malt is required to make Beer of the same Strength from Well Water and from the other.

Rain Water is the softest of all; and makes the strongest Liquor from an equal Quantity of Malt: but the Beer made from it does not keep well. It is therefore fitter for Ales that are to be drank soon, than for Beers that are for Continuance.

Pond Water, when pure, is very good for Brewing, but where Cattle come in and disturb it, and where there are great Numbers of Fish it is never clear. In this Case it neither makes a pleasant Drink, nor takes out the due Strength of the Malt. When Pond Water is in its Perfection it is of a middle Nature between Rain and River Water; but in Places where it is made foul by the before-mentioned Accidents, it is worse than any.

## CHAP. VI.

### *Of Brewing in general.*

**T**HE Farmer having, according to these Directions, prepared or purchased his Malt, and fixed on a proper Kind of Water for it, is to proceed to Brewing.

His Malt is first to be ground, and let him give Orders that this be done moderately. It should be only cracked, and in general shattered in the Mill. This is sufficient, for the Water will in that Case thoroughly take out its Virtue; and if it be broke more it will not answer so well in the Brewing.

Many desire their Malt to be ground very fine, thinking it by that Means answers better in giving out its Strength; but in this Case it mixes with the Water instead of impregnating it with its Virtues; and the Wort runs thick, and the Brewing goes on coarsely.

Let the Farmer always have his Malt ground ten Days before the Brewing. This is the most essential to the brown Malts, because it takes off the fiery Taste they got in their high drying; but it is of great Use to all. The ground Malt must be kept in a dry Place, and it always mellows in lying. The paler the Malt the less Time it needs lye after grinding. In the LONDON Way

of Business it is not easy to give the Malt this Advantage, because they brew so frequently and in such Quantities, therefore the Family Brewer has in this Article an Advantage. In general about eight Days may be allowed to the pale Malts, and from ten to twelve or fourteen to the brown.

The Malt thus ground and kept is ready for Use, and we shall lead our Country Farmer into the Practice, by giving him a general Idea of what is the Method in LONDON, where there are perhaps the most understanding Brewers in the World.

Four Kinds of Beer are in general brewed in LONDON, Stout, common Butt-Beer, Ale, and Small Beer.

Stout is the strongest Beer, brewed from brown Malt; and is sold for forty Shillings the Barrel, or six Pound the Butt, from the wholesale Cellar.

To brew this, the Water in the Copper for the first Mash is made to heat soon, by pouring in a couple of Bushels of husky Malt, just to spread over its Top.

The Degree of Heat to be given this is the utmost that the Hand can endure, but it must not boil.

When it is in this Condition the Fire must be damped, and the best Way is by throwing on a good Quantity of fresh Coals. Then cold Water is to be let in till the whole is just Blood-warm. The Malt is then to be worked in with Oars, half an Hour, and this is called the Stiff Mash.

While this is beating up more Water is boiling in the Copper. This is to be let in; and the whole being mashed again, and well mixed, some Baskets of Malt are thrown over it, and it stands an Hour.

At the End of this Time it is let out into the under Back; and is then boil'd an Hour and half. This, with the due Quantity of Hops, is the Stout.

The common brown Ale, or as they call it starting Beer, is made in the same Manner as the Stout; but a larger Quantity is brewed from the same Portion of Malt. After the stiff and second Mash they cap the whole with fresh Malt and boil it an Hour, and after this Small Beer is made of it. The Difference between brown Beer and brown Ale is only that less Beer is made, and it is boiled longer and has more Hops, proportioned to the Time it is intended to be kept.

The pale Beers are brewed in the same Manner, only Pump Water is used, and it is made hotter at first, and lowered to be almost cold afterwards.

The Small Beer in LONDON is made thus. They heat the first Water with some hully Malt over it, and when it is of a due Heat they let in some cold, and run it into a Tun Milk-warm. The Malt is mashed in this; and then the second Quantity of Water is let in, which is scalding hot. It is to stand an Hour, and then be run off into the under Back.

This makes one Copper of the first Wort without putting any fresh Malt in. The next Liquor is to be Blood-warm, then hot, and then lastly, cool.

This



This is the great Secret of the LONDON Brewing. Their Beer has a very great Advantage from the Quantity that is brewed together; and there is a great deal of Art in putting in the first water Blood-warm, and the Rest hot: for this warm Water opens the Malt beyond any other Practice, and makes it ready to receive, and yield all its Strength and Virtues to the hot.

The Quantities we have not named in the Course of the Brewing, reserving them for a distinct Mention here by themselves, the Strength alone depending on that Article.

The Allowance for Stout Beer is a Quarter of Malt to one Barrel; and this is sold from the Tap at thirty Shillings. The Proportion for the common Brown Ale is a Quarter of Malt to a Barrel and Half. For entire Small Beer the Allowance is a Quarter of Malt to six Barrels; tho' some allow a Quarter to five. The Allowance for Pale and Amber Ale is a Quarter to a Barrel and a Firkin.

Thus have we laid before the Country Farmer the general Proportions and Method of working in the LONDON Brewhouses for their various Kinds of Drink; and from this general Idea of the whole Art, and the Particulars of the several Kinds premised before, he will be able to comprehend the whole Theory, Art or Mystery of the Business, and may safely and successfully enter on the Practice.

## CHAP. VII.

### *Of brewing for a private Family.*

**T**O speak with Certainty, and in a determinate Manner on this Article, we must first establish some regular Quantity intended to be brewed; and some regular Size of the Vessels.

We will suppose that the Farmer has a Copper, which, when filled to the Top, holds a Barrel, that is, six and thirty Gallons; and we will say he is to brew five Bushels of Malt. He has this in the House, it has been ground a proper Time, and there is nothing to be done but to put to it the Water proper of its Kind.

Let the Water be set on in the Copper, and when it is pretty hot pour upon it Half a Peck of Malt. This will keep in its Spirit, soften it, and purify it, and make it heat regularly. When it begins to boil ladle it out into the Mash Fat, and there let it stand about a Quarter of an Hour.

It is often the Necessity of the Farmer to use but indifferent Pond Water in Brewing. In this Case let him pour Half a Peck of Bran upon it instead of the Malt, and when it boils skum that off. It will take the worst Foulness of the Water with it; and is to be given to the Hogs. In the other Case, when the Water is tolerably pure, the Malt is to be used as mentioned already; and this is not to be skimmed off, but to be ladled out with the Water.

When it has stood about the Time mentioned, the Steam will be but little, and the Farmer may look down into it and see his Face in it. This

is the Country Rule, and it is a very good one; for he cannot see it while the Steam rises thick; as it does from the hot Liquor. Separate Half a Bushel of the Malt, and let the Rest run slowly and leisurely into the Liquor when it is of this Warmth; let it be well stirred about as it runs in, and so mixed when all is together, that it does not lie any where in Cakes or Lumps.

It is a common Practice to beat and stir up the Malt in this first Mash into a Hasty Pudding, but this is very wrong: the whole Brewing always succeeds better when it is in this Manner only well mixed together without such Beating. It receives the hot Water the more freely and perfectly, and gives Strength to it in a very fine Manner.

When the Malt is thus thoroughly soaked, the hot Water is to be ladled on by Bowls full, and it is to be suffered to run out at the Tap in a very small Stream, not thicker than a Straw. In this Manner, as the Malt has not been mashed to Pieces in the Water, the Liquor will run off very clear, and will yet have the full Strength and true Flavour of the Malt, according to its Kind; and will much sooner be fine than in the common Way of Brewing.

This is the Method to be taken when the Farmer is for brewing a good Ale, and will make his Small Beer separately, or less regards it: but when he minds the Small as much as the Strong, the second Copper of Water must be poured on quick, and suffered to run off in a large Stream. This will make a good bodied and well tasted strong Beer, and yet there will remain in the Malt Virtue enough for impregnating the Small.

When the first Stirring of the Malt is done, let the Half Bushel that was saved out be carefully spread over it; and then let some Sacks, or other Covering, be put over the Tub to keep in the Steam.

The whole is to stand in this Way about two Hours and a half, and in that Time the second Copper of Water is to be made boiling hot.

This is then to be poured on either briskly or slowly, as we have directed, according to the Design of more or less Small Beer; and when it is in, let as much run off from the Tap as will very near fill the Copper.

Put half a Pound of fine sweet Hops in a Canvas Bag, and putting them into the Copper boil them half an Hour: then take them out; and some fresh ones are then to be put in and boil half an Hour. The Quantity of Hops must be greater for Beer, and less for Ale.

If the Beer be intended for keeping, half a Pound of fresh Hops should be put in every half Hour, and the whole boiled briskly for an Hour and an half.

While this first Copper of Wort is boiling, some scalding hot Water must be poured in upon the Malt, Bowl by Bowl; and thus so much is to be got in and suffered to run off again, that there may be the Quantity of another Copper ready for boiling, by that Time the first Quantity is boiled off.

When this is drawn off the second Running must be put in and boiled an Hour, with nearly the



the same Quantity of Hops as at first; and while this is doing, Preparation may be making for Small Beer, by pouring on such a Quantity of Water as the Farmer chuses cold upon the Grains all at once, or at twice.

This must be boiled up in the Copper in the same Manner as the Ale Wort, and must have the Hops that were boiled before. Each Copper of the Small Beer should be allowed an Hour in boiling. In this Manner five Bushels of Malt will make the Farmer a Hoghead of Ale, and the same Quantity of Small Beer; or if he chuses otherwise, his Ale will be much the stronger and better.

Each Copper of Wort must be strained off through a Sieve, and cooled in four or five Tubs.

The Farmer will find a Hoghead of Ale in this Manner made from five Bushels, a very pleasant and sound Drink: if he chuses to make it stronger, and for keeping, he must boil off only the one first Copper for Ale, and the Rest all for Small Beer; which in that Case will be of a very good Strength.

The Farmer will see that in this Method, although very different from the LONDON Brewer's Practice, yet all that is valuable in that Art is preserved. He may, if he pleases, imitate their Methods, by putting in more Malt after the second Mashing; and thus running off, according to his Pleasure, a larger Quantity of strong or of small Beer: but this is getting into a confused and perplexed Practice. The other is plain, familiar and easy: and we may affirm upon repeated Experience, that whosoever follows it, punctually will brew to his Satisfaction in every Respect, for the good Flavour and the Strength of his Beer.



## C H A P. VIII.

### *Of the Advantages of brewing at Home.*

**W**HAT we have here proposed to the Farmer we would recommend also to every middling Family; and that for more Reasons than will at first be thought. The Difficulty upon this plain Receipt for doing it is nothing; the Time required is only a few Days in a Year, and the Inconvenience is not much: the Advantages are very many. The saving in Money is very near half in half; and the Housekeeper is sure that nothing but wholesome Ingredients have gone into the Liquor, which he

never can pretend to know if he buys it of a common Brewer.

Most People have been desirous of brewing at Home, but they have been deterred from it, partly by their thinking there was some great Mystery and Secret in doing it well; and partly that there required a great deal of Room, and a great many large Vessels, for the brewing but a moderate Quantity of Drink.

We have shewn this to be entirely an Error in both Respects. The Secret is in a Manner nothing, a few plain Words have described it; and in this Method which we have laid down, a moderate Copper, and a few common Vessels answer the Purpose of brewing a Couple of Hogheads.

We have only to add on this Head one general Caution, that Cleanliness be observed in every Thing relating to a Brewery. We have shewn the Necessity of it in a Dairy, and the Brew-house is the next Article to that, requiring it to be observed with Strictness.

Many who brew at Home, find their Beer that was not at all faulty at first, contract ill Tastes, and grow very bad after a little Time; and they little suppose how much this may be owing, and how frequently it is, to the Carelessness of keeping the Brewing Vessels.

In Families where the Brewing comes seldom, the Utensils are laid by carelessly; and the Consequence of this, especially if there be any Damp about them, is, that they grow mouldy or musty.

When Mouldiness is seen, there is a natural Caution for the cleaning it away; but there will be Mustiness when there is no Mark to the Eye: and Servants are often so negligent, that they seem to have the Sense of smelling given them to no Purpose.

We advise whoever intends to brew at Home, to look carefully himself into this Article. Let a Copper of Water, or two if needful, be boiled several Days before the brewing, and let the smaller Utensils be boiled in it; and the larger well scalded with it. Let them all be thoroughly and perfectly cleaned after the Scalding, and then scalded again: after this let them be exposed to the Sun and Air, so as to bleach and perfectly sweeten, but not so as to crack them; and after this let them be set by for Use.

If every Thing be thus conducted, the Malt suited to the intended Kind of Liquor, the Water to the Malt, and the Quantity duly proportioned: if the Working be carefully heeded, and the Vessels clean, there can be no Doubt of the Whole succeeding to Credit and entire Satisfaction.



## BOOK XI.

## PART II.

## OF CYDER.

## INTRODUCTION.

WE have gone through the general Account of the natural and artificial Products of the Farmer's Stock, and might here close that Part of our Undertaking: but as the Husbandman should never be without an Orchard, and as we would have him make every Part of his Ground turn to some Account, we shall advise him to make Cyder from the Produce of his Apple Trees.

Under this Head we are very happy, that we have an Opportunity of communicating to the Publick a Method, of raising this BRITISH Liquor to an Excellence which few know it can reach, and which renders it equal in Value to many Wines. This we receive from a Clergyman; a Gentleman of eminent Knowledge and distinguish'd Candour; and we have Authority to assure the Publick, that it contains nothing but the Result of Experience; that nothing is directed to be done, but what the learned and reverend Author has himself frequently practis'd, and does at this Time practise; and that the Result is his having Cyder superior to any other Person; and for which he has been offered in Exchange Quantity for Quantity of very valuable Wines.

As this is a Method never published, and the Account in some Parts refers to Things commonly known in the Cyder Countries, though they may be strange to the Reader in general, we shall prefix to it an Account of the usual and received Way of making this Liquor.

Those who chuse to practise the old Method, will therefore in this Place have full Directions for doing it; and those who shall follow our Advice, and attempt it upon the Rules prescribed by this valuable Correspondent, will, by having gone through the other Account first, perfectly understand every Process and every Part mentioned in this.

It is proper, in order to trace this Subject from the Beginning, to instruct the Farmer in this Place to plant his Orchard rightly. This falls very well in with our Plan in the present Work, the Intent of it being to instruct the Farmer in every Part of his proper Occupation. This is indeed a Subject we shall hereafter pursue through all its Branches, being determined to publish, after this Work is finished, a Compleat Body of Gardening in the same Form. The specious Appearance of other Works already extant under the like Names, is to us no Discouragement in this Undertaking; because partly the Papers in our Possession, many of which we find relate to Gardening, and partly our own Experience, have shewn us, that the most popular of those Works abound with Errors.

The same Hands which have compiled this Body of Husbandry, intending therefore to continue their Labours with the same Assiduity,

N<sup>o</sup>. 51.

to finish from the like Materials and the like Experience a Body of Gardening, we shall not on other Articles, confound or perplex the Reader, by mixing together two Considerations so naturally separate; but shall reserve to that succeeding Work what Directions we have to give with respect to planting Fruit Trees of other Kinds. Here we shall treat only of the Apple; and under that Head, in the usual Course of our Work, and according to our accustomed Method, we shall first teach the Farmer to plant an Orchard, and bring it to a bearing Condition: we shall then direct him, according to the usual Practice, to make the Advantage of Cyder from his Fruit; and afterwards lay before him these new discovered Methods for improving that Liquor.

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## CHAP. IX.

## Of chusing a Spot for an Orchard.

ALL that we direct the Husbandman to practise is, with a View of Profit. His Orchard we do not look upon as an ornamental, but useful Part of his Concern: and far from limiting it to the trifling Services of the Fruit at his Table; we intend it as the Source of very considerable Advantage in the Article of Cyder, which we shall give him the usual Rules for making, and afterwards these others, hitherto unpublished; which are vouched upon the most certain Authorities, Experience, and the Testimony of others of Knowledge.

If the Husbandman finds an Orchard upon his Farm, tolerably planted, and in a good State of Growth, he is to make the most of it in the Way we shall direct hereafter. If there be none, let him by all Means plant one; if he be fixed for a Continuance: and let the Land Owner never omit that Article. When the Orchards already planted begin to decay, this will be very well worth his while; and we shall here lay down the most profitable Method of doing it.

The first Consideration in the raising of an Orchard, is the Choice of a proper Piece of Ground. It is a Plantation that is to continue a great while, and that may be of very great Value hereafter, it is therefore worth while to be careful.

'Tis most convenient to be near the House, for the Advantage of gathering the Fruit, and for its Safety from their being stolen: but if there be not a proper Piece of Land near, it must be chose farther distant; for 'tis to no Purpose to have Convenience or Security where the Trees will not thrive.

Different Kinds of Ground will suit different Fruits; and if such a Soil as is suited to the particular Kind intended to be raised be not first carefully chosen, all the Expence and Care that shall



shall follow will breed only Disappointment.

Let it be considered that Trees root deep; and accordingly let the Husbandman extend his Regard to the Nature of the Ground, farther than to what appears towards the Surface. Of all Soils for an Orchard intended for Cyder Apples, there is none comparable to firm, rich Loam.

As to what lies under it, let the Husbandman see that it be not a cold, tough Clay, nor a perfectly barren Gravel. Any other Bottom will answer, but in neither of these Cases the Trees will ever thrive. In the Case of a tough Clay Bottom, the Roots will always be chilled, and the Branches covered in the Moss: in Case of the barren Gravel, their Barks will crack or peel, and the top Branches will wither and shew what all the rest suffer tho' less visibly, that they are parched and starved for Want of Nourishment.

The Depth of the good Soil is a very material Article, for Trees spread out Multitudes of Roots sideways near the Surface; and the extreme Parts of these will fill all the good Soil be its Depth what it will: it is therefore of the utmost Importance that they be well supplied with Nourishment.

The next Article to the Soil is the Situation, for this is of great Consequence; and he is happy who finds the Advantages of both together.

An Orchard should neither lie on a Flat, nor upon the steep Edge of a Hill: if it lie in a perfect Flat the Roots will be chilled by too much wet, and it will want the Advantages of Sun and Air which higher Situations enjoy: and on the other Hand, if it be planted where the Descent is too great, little Wet will lie for the furnishing the Roots, and the best Part of the Soil will be washed away from them.

For these Reasons, the proper Piece of Ground for this Purpose is one that has a gentle Rising: here the Sun and Air have free Passage among the Trees, and enough Wet will lie for the Benefit of the Growth, but not enough to do Hurt. In the absolute Flats too much Wet lodges, the Consequence of which is the chilling of the Fibres, if there be no Sun to evaporate it; and if there be 'tis often worse, for the Quantity makes the Air foggy, and is the Occasion of Blights and many other Mischiefs; as we shall shew when we come to treat of that Matter.

Let the Husbandman therefore understand, that if he can find near his House a Piece of Ground that has a gentle Ascent, where the Soil is a rich, deep Loam, and the Bottom neither is a cold Clay nor a bare Gravel, he is very happy in a Piece for an advantageous Plantation.

There are certain Advantages of Shelter from bleak Winds, and Openings to the milder Air, which that Piece of Ground is always to be valued that has; but as this may always be given by a proper Plantation, let the Husbandman be sure, that if Nature has not given it, his Care and Industry do. The North and North East Winds are those which will be most mischievous in the Spring, and very frequently a North West in a more advanced Growth does great Damage;

therefore let him plant in such a Manner about his Orchard, that it be perfectly defended from these Quarters, the North, the East, and the West; let it be open to the South to let in the Sun: and when all that is hurtful is blocked out, and all advantageous admitted in his Plantation, which before had all the Advantages of Soil and Situation, it will also have those of Sun and Air.

The Trees that are to defend the Orchard will grow up with the others, and all will thrive as they ought; only let the Planter in this, as we have warned him on all former Occasions, be careful not to run into one Disadvantage by his Earnestness in avoiding another: his Orchard is to be defended, but it is not to be blocked up. We have shewn the Disadvantages of this to all Growths whatever; and it is in none seen more than these. While the Winds are kept off, there must be a clear and free Passage for Air; or all will come to little. This is to be obtained by planting the Trees intended for Shelter and Defence at proper Distances, and trimming them in a judicious Manner as they grow; leaving on Branches enough to break the hurtful Winds, yet not so many as to choak the Passage of the Air. The Fruit Trees themselves must be planted also with a careful Regard to this Advantage.

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## CHAP. X.

### *Of disposing the Orchard.*

WE now enter on a Point less understood and worse practised than any Thing in the Husbandman's Profession; but we shall endeavour to lay down such Rules as will lead him into a better Tract. Let him observe, that we have said a free Passage of Air is of the utmost Consequence; it must have Liberty to go briskly between Tree and Tree, and to carry up all damp Vapours with it, else they will destroy the Hope of the Planter. Let him first take Care of this in the planting his Timber Trees for Defence. If there be rising Grounds towards the North East and West, they will defend the Orchards without other Help; and when they are wanting, let him plant his Trees for this Purpose far enough from the Fruit Trees, that they be not choaked up by them.

The same Caution is to be observed, that the Fruit Trees do not choak one another. Most Orchards are planted much too close. The Desire of having a great deal of Fruit upon a little Ground is the Cause of this, but the Method they take defeats the Purpose. They do not consider when an Apple Tree is planted to what an Extent its Branches will spread, or how far its Roots will run in the Ground. Let our Husbandman take Care of this; let him give Compass for the Roots that the Trees do not starve one another, and free Air Room for the Boughs, that there may be clear Space enough between those of the several Trees at their utmost Growth for a Passage of the Air, Sunshine and Winds.

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We have, on many other Occasions, spoken of the great Folly of close planting, but in these Trees it is worst of all: they spread farther, and they are to stand longer than others, so that 'tis an Error not to be remedied. We shall assure our Farmer, not on Reason only, but a careful Examination, that of the Orchards in general in most Parts of the Kingdom, if the Trees were but half as many, the Fruit would be a great deal more than it is from the whole. The natural Vapours of the Earth being pent up among close planted Trees will occasion Blights: but that is not all; the Perspiration of the Trees themselves is very great, and that joined with the Vapours from the Earth, will at the same Time hurt the Growth, and give an ill Taste to the Fruit: the Sun is a very essential Thing for the raising a Cyder Apple to its right Flavour, and that is not to be had where the whole is kept in Shelter by the Covering of the Boughs.

The Husbandman who has an old Orchard will do well to thin it by cutting away a great deal of the Heads of his Trees, that the Air may pass more freely; but in the planting a new one, another Sort of Caution should be used, for it is better to prevent than remedy.

We shall shew the Farmer that he would lose less Ground by planting his Orchard very distant than ever so near. In the Common Way of near planting all the Ground is lost for other Purposes; whereas, if the Trees be set at great Distances, it may be tilled as other Land, and will produce Crops in the same Manner; and these, far from impoverishing the Trees, will, by the Culture of the Ground, cause them to grow quicker, to flourish more in every Respect, and to last longer. We have explained in treating of the Horsehoeing Husbandry, the vast Advantage of tilling the Ground while a Crop is upon it. This is a Benefit Trees will share in common with other Growths; and what we are now proposing is with Regard to them in all Respects the raising them by the Horsehoeing Husbandry. The slight rooting Crops of Corn sown in the Ground between them do them very little Harm, and the breaking and dividing the Land by Tillage for these Crops enriches them prodigiously; so that the Advantage is many Times greater than the Damage.

This then is the Plan upon which we advise our Farmer to begin his Plantation. He has chosen a Piece of Ground of proper Condition, and of sufficient Extent: it is defended properly, and yet open to the best Influences of the Air. All this serves for the Advantage of the Corn as well as the Trees; and let him consider the Piece therefore as a Quantity of arable Land as well as an Orchard. This Caution only is to be given him, that he sow upon it none but the slight and shallow rooting Crops, as Corn, the Pulses, and the like: for the others would interfere with the main Design, and be every Way improper.

His Ground being thus chosen, let him make a Plan of it upon Paper, and mark the Places of his Trees. Let him dispose them in regular Rows; and let these Rows be thirty Yards asunder; and the Trees twenty Yards from one another in the Rows.

Such a Plantation will have all the Advantages an Orchard possibly can enjoy. It will bear as much Fruit as it will be possible by any Art to obtain from an equal Quantity of Ground; and all the Time the Farmer will have the Benefit of it as so much Land like the Rest. In the first Year every Foot of it will bear as well as any other Ground; and when the Trees are fully grown, he will only lose the Advantage of a small Spot round each, which therefore it will be prudent in him not to sow: the Ground will all bear, except just under the Shadow of the Boughs.

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## C H A P. XI.

### *Of making the Plantation.*

THE Farmer having thus established in his own Mind, what is best for the planting his Ground, and to avoid Forgetfulness or Mistakes, having drawn the Plan of his intended Orchard on Paper, which indeed it requires no great Skill to do, he is to proceed to put this in Execution.

We will suppose it Spring, and the Ground he fixes upon to be a Piece that is in Pasture: let him not count so much upon the Profit of the Summer's Grass, as to defer the Work till it is got in or eaten off; this is a small Advantage in Proportion to what he is about. Therefore early in the Spring let him plow it up, turning the Turf in that it may rot. Three Times in the Summer, at equal Distances, let it be plowed over again, to break and divide the Soil, to tear the Turf to Pieces, and to prevent the Growth of Weeds. The last of these Plowings should be toward the End of SEPTEMBER; and this should be a very deep one, that the Ground may be prepared for the Reception of the Trees.

There are two Seasons for planting the Trees, and the Farmer should take no certain Resolution in Favour of one or the other; but be guided by the Weather, and the Nature of the Ground.

If the Soil be dry, and the Autumn favourable, any Time in OCTOBER the Trees may be put into the Ground: but if the Weather be extremely rainy, and especially if the Soil be inclined to Wet, then the best Season is the second Week in MARCH.

As to the Choice of the Trees, the great Article regards their Age: for in this many have run into a very material and very mischievous Error, by the planting them too large. It is certain, that an Apple Tree may be removed when of a considerable Growth, and that it will bear very well after it; but it will neither bear so well, nor continue so long, as when planted young.

The best Age of a grafted Apple Tree for planting as a Standard, is at three Years from the grafting; and for this Use they should always be chosen upon a Crab Stock, for none is so lasting.

Let our Farmer examine the Ground from whence he has them: by no Means let him take them from a better Soil than his own: if he can have his Choice, let them be such as have stood



on a Ground like his, but not so rich: their transplanting them will be natural, and they will at once take to the Land, and thrive apace in it.

Let a Stake be set up at every Place where a Tree is to be planted, and a large Hole opened for its Reception: let the Earth that is thrown out be well broken, and laid ready to put in when the Tree is set. A great deal of Hurt is done in these Plantations by the Holes not being made large enough, and by the Earth being thrown in carelessly: when that is large, and the Ground that fills it is well broken, and is spread regularly, and settled by a gentle Watering, the Tree roots itself at once, and grows without any Check from the moving.

It is always best, when it can be done, to buy the Trees from a Nursery at a small Distance from the Place where they are to be planted, that they may not suffer by being kept long out of the Ground: and on all Occasions the more Expedition is used in planting them the better; for they get Harm by the Air coming to their Roots.

When the Trees are thus brought into the Ground, one is to be laid by the Side of each Hole; and both the Roots and the Heads are to be pruned before they are put in: the best Way is to prune the Roots as the Tree lies, and the Heads as soon as it is planted: for the treading about the Roots in doing this afterwards, and the gentle shaking it gets in the handling, help to fasten and settle them, and the watering coming on upon that compleats it effectually.

In the pruning of the Roots the first Care is to look if any be bruised or injur'd in the taking up or Carriage; such are to be cut off a little above the bruised Part: after this let the Course and Manner of growing of those which are left be examined: it often happens that they cross one another, crush one another, and are thus very hurtful: in this Case one of the two must always be cut off just above the Place; and when the larger Roots are thus regulated, the Fibres must be pruned. These must all have their Ends cut off; and it should be done just before the putting them in the Ground, for the Air always takes an Effect upon these slender Parts very suddenly.

If there be any decayed, mouldy or rotten Roots, they are to be cut off in the same Manner; for it is a Damage that spreads, and will infect the sound ones.

All being thus ready, let some of the fine broken Mould be scattered in the Bottom of the Hole, and the Tree set on it perfectly upright, and not too deep: then let the Rest of the Mould be thrown in a little at a Time, and the whole laid level and smooth at the Surface, when every Part of the Cavities between Root and Root has been filled up.

The Tree is now in the Ground, and the Head is the next Care. In old Time in ENGLAND Gardeners were afraid of taking off the smallest Shoot from a new planted Tree: at present the Fashion is opposite; the Gardener with his Knife is as terrible as the Surgeon with all his Apparatus of Instruments; and he thinks the more he cuts away the more he shews a masterly

Hand: both Extrems are wrong. Indeed what Extream is not!

The new planted Tree will not be able to support so large a Head at first Setting, as it did while in the native Ground: but on the other Hand, if some be not left on, it cannot thrive. We have before acquainted the Husbandman how essential Leaves are to Trees; and he will therefore plainly see the Folly of cutting them all off with the Branches.

What he is to do is to take off a Part, and to manage his Knife in such a Manner, that what is left on may be of such Growth as to form a well shaped Head.

When the Tree is thus planted upright, and reduced to a proper Shape and Size in the Head, it is to be secured from Damage by Winds by staking. To this Purpose a strong Stake having been driven down near each Tree, the Stem is to be tied to it with a Hayband, or some other soft Substance, that will not hurt the Bark.

This done, the Plantation is secure: the Husbandman is to till the Ground between the Trees. They will grow up without his Care if the Seasons favour them; if not it will be proper for him to water them at Times, both the first and the second Year. The new Plantation will be starved by being left too dry; but there is no greater Mistake than the watering them too largely. In the first Case the fine and small Roots shrivel up and wither; and in the latter they are all rotted by the Abundance of Wet.

We have spoke of laying Sones about the Roots of new planted Forest Trees, to fix them and to keep the Ground moist; but we shall here propose a better Method for these Plantations.

Let there be a good Parcel of Turf pared pretty thick from a Common, and brought fresh into the Ground, and let a Quantity be laid down by the Foot of every Tree. Let a Labourer carefully spread this round the Bottom of the Stem, laying the Turf Part downwards; and then covering the Ground with it two Foot each Way from the Tree. This needs not set aside the Use of watering, for it will make it answer much better, because the Moisture will be detain'd as long as it ought; and this Turf may be afterwards dug in as a Manure. This Kind of Plantation we shall explain in a Folio Plate, at the Close of our Directions concerning Cyder.



## CHAP. XII.

*The general or common Method of making Cyder.*

WITH Respect to the Choice and Kinds of Apples, their Mixture and peculiar Management, we shall refer the Reader to the subsequent Chapter. We are not here entering into Particulars, but delivering only the general Method, and universal Rules; that the Process of Cyder making may be understood in itself, and consequently the following Account be understood without Hesitation.

The Apples intended for Cyder must be picked clean, and their Juice expressed or squeezed out. The picking them is an easy as well as a needful Article; no Filth or Foulness of



of any Kind must be mixed with them; and if there be any decayed ones among them they must be thrown away.

The picked Apples are to be put into the Mill, where they are mashed and ground to Pieces by a Stone moved round upon them: this is the proper Method for large Quantities; but any Method of bruising and squeezing them thoroughly will do.

The Juice of the Apples being thus squeezed out, is to be caught in proper Vessels, and as some Foulness will have come among it, it must be strained. A tolerably close Hair Sieve answers very well for this Purpose, or a Canvas Bag may be employed, or any other Contrivance that will let the Juice run freely through; and keep back the gross Particles.

The Juice thus strained from Impurities is to be put into a Vessel, which must not be quite full. It is to be covered loosely, and set quietly by for three Days.

At the End of that Time it is to be covered up as tightly and closely as may be with Clay; and then the Business is to watch for its growing fine.

This is to be known only by trying from time to time. To this Purpose a small Quantity is to be drawn out once in a Day or two, and examined in Point of Clearness. When it is sufficiently clear, it is to be pierced for a more certain Examination of the whole.

In this Respect we are to inform the Farmer, that he is to consider his Cyder according to the Nature of the Apples under three Kinds. These may be named according to the Apple; 1. The Summer Fruit Cyder; 2. The Gennet moil Cyder; and 3. The Redstreak Cyder. These have their three several Times at which they may be naturally expected to arrive at this Degree of Fineness: the Time of the Summer Fruit Cyder is about a Month: the Gennet moil Cyder seldom comes to it till toward the Beginning of OCTOBER; and the Redstreak Kind not till JANUARY.

These are not to be supposed certain, invariable, and universal Rules, for there can be none such. The Weather, the Temperature of the Air, and the Degree of Ripeness of the Fruit, all these singly, and two or more of them together, will naturally make very great Variations. Sometimes a Quantity of Cyder will be fine sooner than could be expected: frequently it takes a Fortnight longer for the Summer Fruit Kinds, and a Month or six Weeks longer than the natural and usual Time for the others.

In general the Winter Fruits of all Kinds are to be expected to answer in the Manner of the Redstreak, and when after a Month, or at the utmost six Weeks more than the usual Time, they are not grown fine, they must be racked off as clear as may be in the Manner of Wine.

Many Expedients have been used to fine down the Cyder that does not answer as it should, but most of them are very improper. There is however one eminent Ingredient, that is of excellent Service to this Purpose, and may be used with perfect Safety. This is, Isinglass. It is a very harmless Drug, and when dissolved is of such a clammy Quality that it lays hold of all Kinds of Foulness; and when the Fault is not

too great will carry all down with it, and leave the Liquor perfectly fine.

As we have named this Ingredient, we shall inform the Farmer how he is to use it, for there is nothing so generally mistaken. Isinglass is brought from the Northern Parts of EUROPE, where it is made by boiling the finewy and skinny Parts of a Fish, much like a Sturgeon, to a Jelly; which is then poured out upon a Table to dry, in the same Manner as our Glue is made.

The common Method of the Country is not to cut it out into flat Cakes, as we do our Glue, but to roll it up into long Pieces, which they double together in the Shape of an Iron Staple.

This is the Shape in which Isinglass comes to the Druggists, and they are ready enough to sell it in this Form: but this is not the Way the Farmer is to buy it. These large Lumps are very hard to dissolve; but when it is beaten out into thin Shivers, it will melt in any Liquor that is not too strong, without much Difficulty.

Water dissolves it best, because it has been boiled up in Water; but this is not the right Method for Cyder, because the Addition of any Water will impoverish the Cyder, and therefore have a just contrary Effect from the fining of it; any thing that weakens a Liquor of this Kind naturally rendering it cloudy.

For this Reason the best Way is to dissolve the Isinglass for the present Purpose in a good bodied white Wine. As this is a stronger Liquor, the Isinglass will not melt so freely in it, therefore there is the more Occasion to buy it in a proper Condition. Let the Farmer who wants this Drug therefore, see that he ask for beaten Isinglass, and that it be well beaten into thin Shivers. Then he is to put it into the Wine for fining down the Cyder.

It will be fit for Use as soon as it is thoroughly melted, but not before: this is a thing that is done slowly: some hasten it by Heat; but that is not so well. If the Wine and Isinglass be set over a gentle Fire, and kept stirring, it will in some little time melt; but thus the Wine loses a great Part of its Spirit, and often the whole gets a burnt Taste. This is to be guarded against in the most careful Manner; if the Necessity of the Farmer's Affairs make him use the Way with Heat: but the better Way is to take a proper Time, and let it dissolve in the cold.

The fine beaten Isinglass is for this Use to be put into a large Bottle, two thirds filled with Wine; and set by in a Cellar. It is to be shook gently from time to time, and by Degrees it will perfectly dissolve, and the whole will make a fine Jelly. This Dissolution is much more perfect than that with the Help of the Fire, and it always succeeds much better when put to Use.

When the Cyder is thus made fine by an innocent Addition, or when it has, in the common Course of Time, become fine of itself, it is to be drawn off at Pleasure and bottled, if the Farmer chuses.

This is the common Rule for making Cyder; and by this the Reader who had not before been acquainted with the Subject, will know the Nature of the general Practice. This being premised, we shall give the Reader the new Improvements of the Gentleman we have before mentioned.



## C H A P. XIII.

*The Reverend Mr. GEORGE TURNER'S Method of making Cyder.*

AS we are here about to present the Reader with a compleat Treatise on this useful Subject, obtained from its Author at some Expence; and as we hope very well worthy the Publick Attention, it may not be improper to prefix to it what we have been informed concerning its Contents.

The first Notice we received of this Treatise was in a Letter from Mr. PENROSE, of PENRYN in CORNWAL.

This Gentleman acquainted Mr. OSBORNE, one of the Proprietors of this Work, that Mr. TURNER, Clergyman of that Neighbourhood, greatly respected for his Learning and Integrity, had written such a Treatise from his own Experience; which he apprehended might be procured for the Service of our Undertaking. Upon this Gentleman's acquainting the Proprietors farther, that the Author had lived many Years in the SOUTH HAMS in DEVON; that he had great Experience in the Subject, and his Rules, so far as they had been communicated to the Cyder-makers, had been greatly approved and followed; and that the Treatise itself, though never published, had received the Approbation of the late great Doctor MEAD, and had, at his Recommendation, been read before the ROYAL SOCIETY, and universally approved; he was requested to obtain it from the Author on any reasonable Terms, that a Piece of so established and authenticated Credit might not be lost.

In Consequence of this Commission we have been favoured with the Essay, which we here deliver to the Publick as it comes to us, with this additional Recommendation, that the Author of it, who lived fifteen Years near TORNESS, and had always the Reputation of making the best Cyder there, had since his Removal into CORNWAL introduced his Method so happily, that the Cyder of that County, which never had been of any great Credit before his coming thither, is now advanced to such a Degree of Perfection, that the DEVONSHIRE People, of the most famous Cyder Places, acknowledge they have none equal to it.

We have the Pleasure to receive also with the Treatise this farther Testimonial of its Worth, that the Right Honourable the Lord EDOECUMNE, Mr. HONLYN, and many other Noblemen and Gentlemen of distinguished Knowledge, who had read it in Manuscript, were desirous it should be printed for the Publick Good.

To these Testimonials of the Worth of the Piece, we have only this to add, that it is published entire, at the express Instance of the Author. We should have given the Reader only the practical Part of it, according to the Nature of this Work; but the express Condition on which we received it was, that it should be published exactly from the Manuscript, without Addition, Diminution, or Alteration. We did not think it justifiable to deprive the Publick of a Piece recommended to us under the Countenance of such great Names, on any scrupulous Strictness

of that Kind; and having accepted it under this Condition, we have no Right to violate the Engagement.

The Treatise follows literally from the Hand Writing of the Author.

*English Liquors best suited to English Constitutions:*

O R,

## An ESSAY on CYDER.

*Directing how to order the Fruit: how to make, manage, and improve the Cyder to the best Advantage: how and when to Bottle it: and even how, and when, to drink it too, for Health as well as Pleasure.*

By GEORGE TURNER, A. M.  
Vicar of MILOR, in the County of CORNWAL.

## P R E F A C E.

THE Rules laid down in the following Essay, for the Management of Cyder, have received the Approbation of an Honourable Society; as being founded on Nature, Reason, and Experience.

Although I have no Right to mention the Name of the worthy Member, who recommended this Essay to the Notice of that learned Body: yet I cannot conceal, that he stood, for many Years, at the Head of the Profession of Physick; and even to the Time of his Death. As the Rules themselves were at first drawn up at that Gentleman's Command, (for I took his Request to be such) and almost in the same Form of Words, in which they are now presented to the Publick: so that induced me to borrow so many Allusions from the Practice of Physick. What Mistakes I might be guilty of in touching upon the Medicinal Art; I had received such Marks of Friendship from him, as gave me fair Hopes of being entitled to his Correction. And I am strongly convinced, from repeated Observations in both Kinds, that the Fermentation and Cure of Cyder cannot be better illustrated, than by some particular Symptoms discernible in Human Bodies.

But its being manifestly calculated for the Benefit of my Native Kingdom, is that which hath rendered this little Treatise on Cyder acceptable to some others of my judicious Friends, as well as to the Gentleman above: for as their Hearts are entirely English: so they would no more consent that the Health of their Countrymen should be impaired by French Liquors, than that their Understandings should be subjected to a French Religion.

As for those who are already captivated, both in Body and Mind, and who will swallow French Brandy in spite of their Experience, as they do French Principles in Defiance of their Reason, I do not pretend to reclaim them: their Constitution, in each Capacity, is broken, and they are past a Cure. The Sight of Multitudes dropping into their Graves, through an immoderate Use of strong Spirituous Liquors, can no more convince them of their pernicious Quality, than they can be persuaded of the monstrous Absurdity of Transubstantiation itself, which goes down smoothly with them, even against the palpable Conviction of their own Senses.

But



But let such Soakers be upon their Guard: for they can no more blame the FRENCH Merchants for smuggling their Brandy, than they can find Fault with our ENGLISH Apothecaries for vending Arsenick. It is a Branch of the Business of both: and if some get their Death by an indiscreet Use of that whereby others procure their Livelibood, the Fault is entirely their own. If they will continue to drink Brandy in Spite of Fate, when they are assured that an immoderate Use of it is perfect Poison; their Bane is of their own seeking, and they must take the Blame, as well as the Harm, to themselves. They fall an unpitied Sacrifice to their own Folly; and become the Jest and Derision of those who slyly furnished them with Materials for their Ruin. For as the County of CORNWALL, by running out into a narrow Peninsula betwixt two Seas, doth not afford us any considerable Rivers; so the FRENCH very merrily, but sarcastically, retort upon us for the frequent Cargoes of Brandy they furnish us with: that they know not what Use we can make of such a vast Profusion of that Liquor every Year; unless it be to drive our Corn, and stamping Mills with it for Want of Water. That I might take an innocent Revenge upon them, the Design of the following Dissertation is to rectify the Manners of my Countrymen, as well as to cure their Cyder. To convince my Neighbours of CORNWALL in particular, (who lie most exposed to Danger) that they sacrifice every thing valuable, (their Health, their Wealth, and their Reputation) to the Whim of an ungovernable Appetite. That Providence\* hath been vastly kind to us; and that we want nothing but Innocence and Temperance, to render our Lives as happy and comfortable, as they may thereby become long and durable. That the Liquors of our own Growth, and the Juice of the Apple in particular, if well managed, would supersede the Use of foreign † Wines, and prove more conducive to Health than any of them.

If this Essay hath its desired Effect but upon the two Western Counties of CORNWALL and DEVON, I shall be content, for their Sake, to draw the Displeasure of the whole Kingdom of FRANCE upon me; especially at this favourable Conjunction, when the whole Navy of ENGLAND stands ready to guard and defend the Rights of GREAT-BRITAIN both at Home and Abroad.

Milor, January 29. 1756.

\* Rejoice, O BRITAIN, sever'd from the World

By Nature's wise Indulgence. Indigent  
Of nothing from without: In one Supreme  
Entirely blest; long may he reign!

— Choice Nectar, on which always wait  
Laughter, and Health, and Care-beguiling Wit,  
And Friendship, chief Delight of humane Life!  
What shou'd we wish for more; or why in  
Quest

Of foreign Vintage, insincere, and mixt,  
Traverse the extreme World, when native Land  
Imparts from bounteous Womb annual Recruits  
Of Wine delectable; that far surmounts  
GALLICK or LATIAN Grapes. And shall we  
doubt

T' improve our vegetable Wealth? which will  
supply  
What frugal Nature asks.—

Mr. PHILIPS's Poem on Cyder.

1. **I**N the Improvement of Cyder the first Rule to be observed is, that all the Apples be permitted to drop from the Tree; that they may have the full Benefit of the Stock on which they grew, and of the Sun their Foster-Father: for by striking down the Fruit before it is ripe, the Buds are struck off with it, the Tree is injured, and the Cyder that is made is tart and harsh, for Want of Time to meliorate the Juice.

2. Let your Apples (especially in windy and tempestuous Weather) be gathered up once or twice a Week, and thrown together in some secure Place without Doors; for hoarding the Fruit in a House is apt to give the Juice a musty Taste, for Want of a free and open Air. It also prevents the Cyder from quick refining, by rendering the Juice flat, dead, heavy and unapt for Fermentation.

3. Let your Apple-Heap be made on slanting and open Ground towards the South, that the falling Rains may fleet from it, and that your Fruit may be exposed to the Eye of the Sun.

4. To erect a slight Covering of Reed over the Apple-Heap, supported by four tall Sticks, will be very proper; the fore and higher Part of the Covering fronting the South. By the Shed so contrived and situated, your Fruit may at once have the Refreshment of the Air, be defended from Rain, and be also visited by the Sun. But let the Bottom of the Apple-Heap be covered, or paved with broad Stones, and edged round with the like Sort, to keep the Fruit clean and close together.

5. Let your Apples lie in the Heap a longer or shorter Time, according to the Nature of them. Mediates, for Instance, being of a hard Kind, and their Juice austere, do require a Month in the Heap, or more: whereas White-Sours, being of a softer and more early Sort, a Fortnight, or less, for them may be sufficient. But the Time for each must be proportioned to the Ripeness of the Fruit, and to the various Dispositions of the Air and Weather. For, according to the Quality of the Fruit, and the Temperament of the Air, the Apples run sooner or later to Decay.

6. When your Apples are pounded, let the Muck lie a Day before it is squeezed. It will improve the Colour of your Cyder, and render it of a deeper Complexion.

7. If you make a Tun of Cyder at one Time, and have a Vessel large enough to contain it all, it is a good Way to keep it together: that it may all become fine at the same Time, and be fit for racking.

8. When your Cyder is fine, (which it sometimes happens to be within a Day or two, especially upon a dry, \* Northern, or Eastern Wind) then, by a Cock placed within half a Foot of the Bottom of the Vessel, always allowing Room for the Dregs to settle in; it must be racked off into Hogsheads.

\* The hoary Frosts and Northern Blasts, take Care,

Thy muddy Cyder to refine, and drive  
Precipitant the baser, rosy Lees.

PHILIPS.

But



But although Cyder be rack'd never so fine at first, it will ferment again and become foul, especially in rainy and tempestuous Weather, and upon southern and western Winds; (just as the Humours in a Man's Body are set on float, and put in Motion when the Winds are in the same Position; and therefore Laxative Potions are wont to be administered at such critical Conjunctions) and then your Cyder may require several Rackings before you give over your Care about it: for all wet Seasons are injurious to new Cyder, by causing a constant Fermentation for a Month or six Weeks, and longer too, if the rough Winds and foul Weather do so long continue. You must therefore be very observant of them, and watchful against them, by frequent racking, whether your Cyder be fine or not; in order to prevent its over Fermentation, and to keep it quiet.

9. Let this be a standing Rule for your first racking: namely, to set about it when the thick, red Head, or Crust, which covered the Cyder, (like a Mantle upon a Patient under a Course of Physick) that so by its kindly Warmth a Fermentation may be promoted, begins to separate, and white Bubbles do appear. For although your Cyder be foul at that very Juncture, it is yet very proper to rack it: otherwise your Cyder (like a Man wasted by an incorrigible Diarrhoea, or a violent Super-purgation) may become incurable: for it will then (especially in wet Weather) instead of a gentle Fermentation, be put upon the Fret, and (in the SOUTH-HAM Phrase) sing; the wild Notes whereof may be heard at a considerable Distance) till it becomes \* pale, thin and languid; and (like the Swan) hath sung itself to Death.

*\* Cyder of pallid Hue declares the same  
Devoid of Spirit: wretched be that quaffs  
Such Wheyish Liquors. Oft with Cholick Pains,  
With pungent Cholick Pangs, distress'd be'll roar.  
And tofs, and turn, and curse th' unwholesome  
Draught.*

PHILIPS.

A critical Racking, therefore, is like a critical Bleeding in a Fever; or a well-timed Cathartic, Emetick, or Clyster in a violent Fit of the Cholick; and both the Liquor and the Patient are preserved by Evacuations adapted to their respective Disorders.

10. To prevent Waste in racking, and, at the same Time, to dispose Cyder for becoming fine the sooner, Recourse must be had to Percolation.

Get Flannel enough for five or six Bags, each containing five or six Quarts. Let those Bags be made of a conical Figure, like a Sugar Loaf, or what the Gentlemen of the Faculty do affect to call by their Master's Name, the Sleeve of HIPPOCRATES: (as if the Prince and Father of Physicians had carried some of his Art in his very Cloathing, and so his Disciples pinned their Faith upon his Sleeve in a literal Sense.) Let the small Ends of these Bags hang downwards, that the Cyder, by its impending Weight, may the sooner be impressed through them. Let the upper and open Parts be edged or bound round with Inkle; that they may the better support the Weight of the Liquor.

11. When your Bags are thus prepared, get a strong Hoop, and having fastened two Sticks across in it, tie up your Bags to them. The Center, where the two Sticks meet, having a Rope fixed to it, and the Bags being made to hang perpendicular over a large Vessel, pour that Cyder into them, which remains at the Bottom of each Hoghead after racking; and which is too foul to be mixed with the Rest. By this Method Abundance of Cyder (and fit for common Use) may be preserved, which must otherwise have been thrown away with the Lees.

12. An empty Hoghead must be kept on purpose for the Reception of the percolated Cyder, into which it must be thrown from Time to Time, as soon as it is strained. The Cask must be closely bunged, as often as the Cyder is thrown into it, lest the Liquor become flat by being too much exposed in an open Vessel. The percolated Cyder must also be racked, when there is a good Quantity of it together, and it is become tolerably fine.

13. To adapt your Cyder to all Palates, you may, either at your last Racking, or just before you bung and stop it up, \* mix several Sorts together, and so render your Cyder rough or mellow, to what Degree you think fit.

*\* There are that a compounded Fluid drain  
From diff'rent Mixtures, and the blended Streams  
(Each mutually correcting each) create  
A pleasurable Medley, of what Taste  
Hardly distinguishable.*

PHILIPS.

14. By thus mixing your Cyder, you may give all that you intend for your own Table, the agreeable Taste of the White-Sour. The Juice of this Pom-Royal being of such a predominant Quality, as to communicate its Flavour, in a very distinguishing Manner, to all the Cyder with which it is in any due Degree mixed, Providence seems to have ordained it for this very Purpose.

I know, indeed, that in the Parts about MODBURY and KINGSBRIDGE, in DEVON, where the White-Sour Fruit doth much abound, the People are more tormented with the Gout, than in any other Part of the County. This they attribute to the Use of White-Sour Cyder. But ought they not rather to impute their gouty Complaints to their Groat Ale of several Sorts, with which those Parts no more abound than any other! Are not these Liquors too foul to have a clear Passage through them; and what becomes of their foul Contents? Must they not of course rack and torment the Bodies that harbour them?

But, if these Gentlemen are so in Love with their grouty Liquors, as not to perceive the Mischiefs they suffer from them; (for, of all fermented Drinks, those of the Groat Kind seem to be the worst) if they are resolved to acquit the guilty, let them not be so unfair, as to condemn the innocent. Before they appear in open Rebellion against this King of Cyder Fruit, and take up Arms to lop off the Heads of their White-Sour Trees, and to graft them to another Kind, (which, I am told, they are confederated to do after many Years Mutiny) it is no bad Advice to them to suspend their intended Hosti-



lities, and to try the Difference, by racking their White-Sour Cyder more, and by drinking less of it unmix'd than they are wont to do. If these tender-footed Gentlemen do really find their White-Sour Cyder potent and searching; even after they have well subdued it by racking; one Hogshead of it (like what the Merchants call their Full Wine) will serve to improve two of another Sort, and to render all three more fit for their own Tables at Home, if not for the Markets Abroad. For White-Sour Cyder communicates its Virtue and Flavour to other Juices, as a merry Companion doth Life and Spirit to every Member of the Society in which he is engaged. And who would fall out with a Liquor so friendly and diffusive of its Favours, as to distribute them thus frankly, and without Reserve, for the common Good?

15. Various are the Practices of People in stopping up their Cyder; some doing it early, and others leaving it open till CHRISTMAS, and longer, if the Weather continues mild; or the Frost be not severe.

As I have fully experienced both Ways; so I must give my Judgment in Favour of the latter. Due Regard ought, however, to be had to the Nature of the Fruit, and to the Time of pounding: for as the Cyder which is first made, may, at CHRISTMAS, be twice as old as the last pounding; so, coming from a more early Fruit, and therefore sooner discharging its windy Effluvia, (the only Use and End of its being left open at all) it ought, for that very Reason, to be the sooner bunged up.

16. While your Cyder continueth unstopped, a slight and loose Covering of Board, which may reach from Hoop to Hoop, ought to be put over the Bung-Hole, to prevent the Dust, Rats, and other Annoyances, from breaking the thin Film, or unctuous Substance, which investeth the Surface of the Cyder; as a Guard intended by Nature for its Preservation, like Oil upon a Flask of FLORENCE Wine.

17. Especial Care must be taken also to fill the Hogshead to the very Top of the Bung-Hole, at the last racking; that if any light or flying Lees remain in the Liquor, they may be removed at the Bung: for this is frequently the Case of mellow Cyder: and if those Lees are permitted to remain in it, the Surface of them, by being exposed to the Air will become sour. That Tartness will by Degrees render all the Cyder (whether it be in a Hogshead, or in a larger Vessel) of the same Complexion. Yea, the Taint may be perceived to descend gradually: for while the Cyder is sour at the Top, it is found a few inches below it; till (like the Palsy, which takes its Rise from the Capitol, or Brain, the Seat of the nervous Stock) it descends from Head to Foot, from Top to Bottom.

18. This is the grand Article in which People are wont to be deceived, and by which they are rendered out of Love with racking of Cyder, how much soever they are pleased with it, when it happens to answer their Wishes: for when their Cyder turns sour, they are so weak as to imagine that racking takes away the Spirit of it, and that it must then become sour of Course, for Want of a Body to support it, as they are Numb, &c.

wont to speak: whereas, in truth, it grows sour for Want of Skill how to secure it after the last racking; by removing the light Lees which swim on the Top of the Liquor, before they acquire any the least Degree of Acidity from the impending Air, to which the Cyder is exposed. And if the Hogshead is not full, or the Bung-Hole is not large enough to admit the doing of this by a Spoon, the Cyder must be racked again, though it be as clear as Rock-Water, or as fine as Amber: And Racking indeed is the surest Way; for some of the Lees may escape the Spoon, and therefore there is no certain Dependence upon it.

19. And under the Article of Racking I must moreover observe, that the Person employed in racking your Cyder, must be particularly careful to wash and dry his straining Bags, racking-Tubs and Buckets, lest they cast a sour Look upon him at the Time of his next Racking. He must be as neat in his Cellar, as a Maid in her Dairy. No more Marks of a Sloven must appear in the Vessels of the one, than of a Slut in the Utensils of the other. For Want of this Precaution, as the Dairy abounds with a worse than CORNISH Sour-Milk; so the Cellar is stock'd with a despicable Sort of Vinegar.

20. The Season for \* bottling of Cyder for the second Year's Use, (as that of the White-Sour, Mediate, Redstreak, Fox-Whelp, and others of the strongest Kinds) is at the End of AUGUST, or in the Beginning of SEPTEMBER; that the remaining Heat of the Season may give it just Briskness enough to preserve it the following Winter.

\* *Cyder in Bottles frail improves and smokes  
Transparent, sparkling in each Drop:  
Delight of curious Palates, by fair Virgins crav'd;  
Fallacious Drink! ye fair Maids beware,  
Nor trust its Smoothness: the third circling Glass  
Suffices Virtue. But may perfidious Filts  
(That slyly speak one Thing, another think,  
Hateful as Hell) pleas'd with the Relish weak,  
Drink on unwarn'd; till by enchanting Cups  
Infatuate, they their wily Thoughts disclose,  
And through Intemperance grow awhile sincere.*

PHILIPS.

Cyder thus ordered will be a prudent Reserve against a Year of \* Dearth, and stand good for several Years: longer, perhaps, than the Owner's Curiosity can prevail over his Appetite to keep it.

\* — *Else if the following Years  
Exhibit no Supplies, alas! thou must  
With tasteless Water wash thy droughthy Throat.*

PHILIPS.

21. But Regard must be also had herein to the Difference of Climates. My warm Situation (for Instance) in the Southern Part of the County of CORNWALL, near FALMOUTH, doth oblige me to defer bottling of Cyder till the End of OCTOBER, or the Beginning of NOVEMBER; and even then to let the Bottles remain uncork'd for several Days: otherwise (although I do not bottle my Cyder till it be two Years old) my mellow Cyder would burst most of the Bottles; and thus (like a Chymist who hath laboured several Years in Search of the Philosopher's

7 R

Stone,



Stone, and put all his Materials into a weak Crucible, as the last and finishing Process of his Skill) I should be undone by the cracking of my brittle Ware, and ruined by my own Art.

22. My costly Experience this Way hath taught me also not to fill the Bottles higher than the Bottom of the Neck, even with rough Cyder, and lower still with the mellow Sort. Hereby Room is left for the subtil and volatile Particles to play, and expand themselves in the empty Space, without breaking the Bottles.

As for the Experiment of a certain judicious Naturalist of the present Age, in putting a small Piece of round Cork into each Bottle, for Prevention of Mischief, I never tried it. For if the Cork happens to be musty, or the Parts of it to be separated in the Bottle, it will either prove an Injury to the Liquor, or be an Eye-Sore in it. But it calls to my Mind a beautiful Comparison of a late celebrated Writer; namely, that a great and able Statesman out of Business, is like a huge Whale, which will overset or dash in Pieces a large Ship, if he hath not a light, empty Cask to play with.

23. That your Stock of bottled Cyder may be kept from Leakage, the Corks must be tied down with strong Packthread.

The Bottles ought also to be laid upon their Sides, that the Air may not find its Way by the Cork, so as to hurt the Liquor. The same Caution is needful in all other Liquors, except distilled Spirits, and a few Sorts of the most potent White-Wines. But when the Bottles are placed on their Sides, Care must be taken to decant the Liquor with the same depending Side downward on which the Bottles lay in the Cellar, that so the Sediment may be left behind.

24. And thus I have finished that Part of my Essay which relates to the ordering of the Fruit; to the making, managing and improving of the Cyder to the best Advantage; and to the Rules proper to be observed in bottling of it, and in decanting of it, so that it may be presented to your Friends at the Table in the most elegant Manner.

To lay down Rules to People, how and when to drink their Cyder for Health, as well as Pleasure, may be deemed a needless Undertaking; because they will tell me, that every one is the best Judge of his own Constitution.

But as the Design of this Essay is to rectify the Manners of my Countrymen, as well as to cure their Cyder; so I must here observe, that although Cyder, when well cured, be both a healthful and pleasant Liquor, and is therefore well adapted to an ENGLISH Constitution; yet it is not to be drank at all Times, and by every Person that can swallow.

There are two Sorts of People to whom I ought in this Place to address myself; I mean those who will not drink Cyder, and those who cannot forbear turning Sots upon it.

I am very sensible, that many of those of the better Rank, who have been accustomed to the Juice of the Grape, have their Judgments so perverted, and their Palates so vitiated, that they cannot condescend to the Use of this common plebeian Liquor, because it is ENGLISH.

And it may well be pleaded indeed in Excuse of their Prejudice, that good Cyder being the Production of but few Counties in the Kingdom, even those which do most abound with it, have it so often \* adulterated with Preparations of Treacle, boiled Sugar, Brimstone, Ising-glass, Cochineal, boiled Cyder, and a Number of other Ingredients which I could mention; that, instead of being an innocent Liquor, (as it is in itself) it becomes a very offensive one. For while such over-busy Practitioners do only study how to please the Eye, and to cheat the Palate, the Stomach (which ought to be chiefly regarded) is entirely neglected. Whereas, by attending to the plain Dictates of Nature, and narrowly watching her Operations, they might keep their pernicious Train of Ingredients and destructive Artillery for other Purposes; and render their Cyder more agreeable to the Sight, more delicious to the Taste, and much more wholesome to the Stomach without them.

*\* This I warn thee, and shall always warn:  
No Heterogeneous Mixture use; as some  
With wat'ry Turnips have debas'd their Wines,  
Too frugal. Nor let the crude Humours dance  
In heated Brass, steaming with fire intense,  
Altho' CORNUBIA much commends the Use  
Of strength'ning VULCAN. With their native  
Strength  
Thy Wines sufficient other Aids refuse:  
And when th' allotted Time is run compleat,  
Are more commended than the labour'd Juice.*

PHILIPS.

On the Score of the many Tricks practis'd upon Cyder, it was that I drew up these Memoirs some Years ago, at the Instance of that worthy Member of the Royal Society, of whom I have given some Intimation in the Preface. That Gentleman had studied Nature very narrowly; and as he reckoned Cyder the most healthy Liquor of any, and was determin'd to confine himself to the Use of it, and to have it managed under his own Eye, that he might preserve it genuine; so he might well confide in my Sincerity, at least, as to the Rules of doing it. Of these I gave him a Specimen in a personal Conference at his own House; and was really as anxious for the Preservation of his Health, as he had before shewn himself truly judicious in prescribing Means for the \* restoring of mine.

*" ————— What Returns  
Of Thanks were due to his Beneficence  
Freely vouchsaf'd, when to the Gates of Death  
I tended prone? If his indulgent Care  
Had not prevented, with unbody'd Shades  
I now had wander'd, and these empty Thoughts  
Of Cyder perish'd. But, up-rais'd by him,  
Each Day and Night my Duty I repay'd  
In grateful Task his Liquor to amend,  
And render pure; as he had done my Blood.*

*The honour'd Name of M ——— shall still employ  
My Thoughts, and dwell for ever on my Tongue.*

I might, from this Passage, take Occasion to enlarge upon the Virtues of Cyder, as a good Diuretick, Pectoral, and even a Cooler of the Blood too, as well as a Diluter of it, when taken in a moderate Way. But this is the Physician's Province, not mine. I only undertake the Cure of  
the



the Fermentation of Cyder, not that of the Blood and Humours.

But as Cyder is allowed by the Gentlemen of the Faculty, to be a good Antiscorbutick also; and hath been known to continue sound through an EAST-INDIA Voyage: yea, to become better by twice crossing the Seas to and from that remote Part of the World; and to \* imitate the Taste of several Sorts of Wine: so I have often wondered that the Board of Admiralty have not, till of late, directed the Use of it to his Majesty's + Navy; and that Maritime Persons in the Merchants Service too, when bound upon long Voyages, should set out from their respective Ports without a competent Stock of it.

\* *Some Cyders have, by Art or Age, unlearn'd  
Their genuine Relish, and of sundry Wines  
Assum'd the Flavour. One Sort counterfeits  
The Spanish Product: this to Gauls hath seem'd  
The sparkling Nectar of Champagne: with that  
A German oft hath swell'd his Throat, and sworn,  
(Deluded) that imperial Rhine bestow'd  
The generous Rummer. Whilst the Owner pleas'd  
Laughs inly at his Guests thus entertain'd  
With Foreign Vintage from his Cyder Cask.*

PHILIPS.

+ *Where'er the Britons navigate their Ships,  
Diffusive to the utmost Bounds of this  
Wide Universe, the British Cyder borne,  
Will please all Tastes, and triumph o'er the Vine.*

PHILIPS.

Much might be advanc'd in Commendation of Cyder, and in Point of Health, to gain it the Preference to Foreign Wines, how neatly soever they are said to be imported; yea, though they are found to answer too that Character of the inspired Writer; namely, to make glad the Heart of Man. For all Wines abounding with tartarous Salts; and the Fermentation of them being quieted, while their Spirit is raised by a Mixture of Brandy in their Cure, the frequent Bibbers \* of them do contract the Seeds of the Gout, Gravel, Scurvy, and other Maladies, to which this our BRITISH Wine doth not render us obnoxious.

\* *I need not tell what dreadful Ills attend  
Immoderate Use of Wine: nor all the Kinds  
Of Maladies that lead to Death's grim Cave,  
Wrought by Intemperance: Joint-racking Gout,  
Intestine Stone, and pining Atrophy.* PHILIPS.

I must not here omit the Names of two eminent Physicians, viz. Sir JOHN FLOYER, and Dr. BAYNARD: the former of whom found much Benefit in a severe Asthma; and the latter owed his Life twice, when in a most deplorable and confirmed Phthisis, or Consumption, to the Use of Apples and Pomaceous Juices.

And if this Fruit was not the Growth of ENGLAND, but the Production of the INDIES, it would, probably, upon the Strength of such Authority, have been celebrated more than it is in our Dispensatories, by QUINCY, ALLEN, JAMES, and the Writers in that Way: be brought over to us either dried or in Conserve: have a top Place in Physical Prescriptions: and be closeted by the Apothecaries among their other rare and costly Drugs.

For that Apples are great Preservatives, as well as good Restoratives of Health, let the several Instances quoted by the said Dr. BAYNARD suffice to shew. Among other Things in Commendation of Apples, he tells us, in his History of cold Bathing, p. 314. of a Gentlewoman and her three Sons, who came to HOLLAND, from somewhere near POMERANIA, to claim an Estate which fell to them as next Heirs, by the Death of some Relation: and that the Sons, as well as the Mother, were so very old, that, betwixt them all they made up four Hundred and thirty-seven Years. For what the younger were short of a Hundred, the elder were above a Hundred; which compleated the same Number of Years. Whether they lived a Century, or more, beyond that Term, our Author doth not say. But when their Way of Living, as to Eatables and Drinkables, was enquired into, it appeared that their Drink was chiefly Apple-Water, or Crab-Apples bruised and steeped in Water; and their Meat plain, simple, Country-Fare, with but little Flesh.

Now as their Drink was what we in ENGLAND call Beverage, that is, a Mixture of Water and Cyder: so the Place of their Habitation being on the Borders of POMERANIA (a † Country famed in History for Plenty of Fruit, and abounding perhaps with Apples too, from which it seems to derive its Name) these, probably, were a great Part of that plain, simple, Country Food by which our Author tells us they prolonged their Lives. Their Flesh Diet was very moderate; just enough (we may suppose) to cook up that ENGLISH Dish of a Squab Pie upon Occasion, and when, in entertaining their Friends, they indulged a little beyond the common and ordinary Way.

But I say no more upon this tender Point, lest I give Offence to the Professors in the Medicinal Art, and so draw upon me the Censure of an arrant Quack, by ascribing such wonderful Virtues to such contemptible Means.

I knew myself secure from the Displeasure of my celebrated Æsculapius. For as he was no less famed for his disinterested Spirit, and Publick Humanity, than for his great Skill in Physick: so, in his various Researches into the Secrets of Nature, he would have been glad to have found all the Virtues of the Materia Medica contained in a single Apple; that he might have had the Pleasure of obliging the World with the valuable Secret.

And yet it is very evident, that if an effectual Remedy was found so near at Hand for the Cure of that single lingering Disease of the Consumption only, a great Part of the Physicians Business would cease. Yea, the Inventor of this Sovereign Elixir Salutis, though he might be rewarded by his Prince with a Patent, must yet expect to be pelted by the Fraternity in general, for exploding the large Trumpery of Physick; as St. PAUL was by the Crafts-Men, for banishing the Heathen Gods out of the World; and so bringing the Gain of their Craft or Occupation to nothing.

And now I am come to Scripture Testimony, it may suggest, perhaps, a Fancy to the Reader, that that Divine ought to be accounted Heterodox, and

† See Collier's Dictionary.



and of a different Opinion from the Church: a Sceptick, or a Free-Thinker, who dares ascribe any Sanative Virtue to a Fruit, the prohibited Use whereof some fondly conceive to have been the Introduction of Sickness, Diseases, and even of Death itself, into the World.

But surely the Apple ought to have the same fair Plea, and Indulgence, with a reputed Criminal at the Bar: I mean, not to be condemned by Hear-say, or Conjecture, till the Guilt is roundly and fully proved. In the mean while let the frequent, and approved Use of Apples after \* Dinner, (even at Tables most abounding with other Provisions, and as proper to help Digestion after a full Meal) serve to vouch for their Innocence at least, without retaining a Counsellor to plead it in Court *vivâ voce*.

\* ——— *ab Ovo*

*Usque ad Mala.*

HOR.

I must observe further, that the Hurt did not seem to lie in the Paradisiacal Fruit itself, but in the Transgression of the Divine Command. The Prohibition might have been annexed by God to whatever Subject he thought fit. But on what Fruit soever it was fixed, the Fall of Man is not to be ascribed to any pernicious Quality in the Fruit itself; but to the Disobedience of a curious, unruly Appetite; edged on by Pride, and by the sly Insinuations of that cunning Serpent the Devil.

Not but that it hath been conjectured by some very learned Men, that the Fruit of the Forbidden Tree was impregnated with some fermenting Juice, which (like that violent Operation too frequently perceivable in Cyder) put the Blood and Spirits of our first Parents into great Disorder; and thereby divested them of the Power and Dominion which their Souls had before over their Bodies. That it clouded their Intellects, corrupted their Wills, and reduced every Faculty of their Minds to a shameful Deformity, to a miserable Depravity. Like that INDIAN Juice, which is said to turn even the most sagacious and sensible Man that drinks it into an Idiot, or natural Fool.

Supposing therefore that the Mischief did lie in the Fruit itself, I should be inclined, from those ill Properties of it, to conclude, that the Grape, and not my favourite Apple, was the very Fruit forbidden. For it was the Juice of the Grape which gave the first Occasion to Drunkenness, that we read of. By which the first Divine Orator, or Preacher of Righteousness, was befooled and cheated out of his Reason, and became exposed to his own Family: a Shame and Scandal to his Children: a Spectacle not to be endured without a Covering to hide his Deformity. A NOAH transform'd, for a while, into the Condition of a Brute; and wallowing in the Mire and Filth of Sensuality.

With the bewitching Juice of the same Sort of Fruit, but rendered still more mischievous by the Art of the Distiller, unknown to the Antediluvians, (which reduceth gross and large Bodies into a small Compass; as all the Evils, Diseases, and Calamities of Life were said to be crowded together in the little Box of PANDORA: which is a concise Representation of the woful

Effects of the Fall of Man, according to the Heathen Theology) by their Brandy I say, our Neighbours of FRANCE, with their Serpentine Cunning, do draw us into the Snare. For this Liquor (which is extracted from their worst Wines, and even from Dregs) if not warily used, becomes of the same intoxicating Nature with the LETHEAN Waters. It obliterates, for a while, all the Traces of Reason. It destroys Men's Memories, makes them forgetful of what is past, and renders them unfit for present Service. It blunts the Edge of their Understanding, and enfeebles their Bodily, as well as Rational Powers.

Hence a late Physician of much Note in the Literary World, as he was in the Practice of his Profession, hath wittily called all Sorts of Liquors, in which Brandy makes a Part of the Composition, "The Devil muzzled."

But notwithstanding the Muzzle, the Cystis, or Bag of Poison, lieth concealed under the Tongue; and all the Liquors with which Brandy is wont to be mixed, cannot wash away its Venemous Quality. The most that can be said in Favour of such compounded Liquors is, that those who drink Brandy in Mixture with other Ingredients of an innocent or leis offensive Nature, may be said to do it with some Caution, though with some Imprudence. But those who drink it unmixed (*Puris Naturalibus*, according to the Tippler's Language) they really do it without either Fear or Wit; their Conduct is as bad as their Latin.

In the last War with France, when our Prisons were not large enough to contain the Prisoners, those of the FRENCH who had the Liberty to walk Abroad upon their Parole, did sometimes, in cold, frosty Weather, call for a Dram of ENGLISH distilled Liquor at our Publick-Houses. But when instead thereof, a Dram of FRENCH Brandy was brought to them, I am credibly informed, that they only smelt the Liquor, but refused to taste it; saying, it was good for ENGLISHMEN but not for the FRENCH. So hospitable are they to furnish us, in a very plentiful Manner, with what they do not think it safe to drink, or even to taste, themselves! And why should not the ENGLISH be equally cautious of this combustible Liquor, who are not so well acquainted as the FRENCH are, with the Way and Manner of its Preparation?

To return from this long, but not altogether useless, and impertinent Digression.

The Management of Cyder is a Secret, which the Curious are too fond of keeping to themselves. As People have their different, and peculiar Ways of doing it, according to their several Fancies; and as they are notoriously ambitious of excelling one another, in this Domestic Liquor: so, one would think, there was a Spice of Envy mixed with their Emulation, which hinders them from communicating their several Arts. They converse freely enough upon various Kinds of Husbandry; and upon the several Ways of ordering and managing their Lands, in such a Manner as to reap the most advantageous Returns from them. But, amidst their other Friendly Discourses and Communications, they are ever reserved and wary upon the Sub-



Subject of Cyder. Here they sit as mute as the Gentlemen of the long Robe; who, when a Case of Property is stated to them in Company, and Questions are asked about it, do rarely open their Mouths without a Fee; till a chearful Glass hath relaxed their Tongues from their wonted and professed Taciturnity; and opened their Hearts to a generous Disclosure of their Thoughts.

Yea, even those who have obliged the World with Rules and Methods for Improvement of Lands, by the Plantation of Orchards, and from thence have passed on to Cyder; even these, I say, have handled this useful Subject but slightly, and in Transitu, as it stood in their Way to some other Article in View.

Some of them, it must be confess'd, have been nice enough in describing the several Engines for making of Cyder: but when it is made, they even leave it to the Mercy of Chance, whether it prove drinkable or not.

Others have, moreover, recommended a Separation of the good Cyder from the Lees: which, in the modern Dialect, we term Rack-ing. But then they are so loose in their Reasons for, and Rules of doing it; that the Reader is still left to guess when, and how, it ought to be done. Hence is it that that Bee of Arts and Sciences, Mr. CHAMBERS, in his Universal Dictionary, hath said so little upon this Article. Although (like the painful Creature above) he hath ransacked Woods and Forests, Hills and Mountains, Sea and Land, and the Universe itself, for Honey to stock his Hive with: yet (for want of other Flowers, I suppose, to make a Collection from) he is obliged to take up with a single Quotation from Mr. WORLIDGE; and the Reader is still to seek for that Information which he expected.

Nor indeed can the Cyderist be, any other Way, perfect and compleat in his Art, than by narrowly attending to the whole Course of Fermentation. He must as nicely watch the several Periods of it, as a careful Physician notes the several Periods of an intermitting Fever, in a Patient whose Life he is anxious to preserve:

If any clear and distinct Treatises of Cyder have hitherto been published, they have escaped my Hands; and so fall not under the general Character above. For want of the Sight of any such, I conceived there might be Room in a wide World, for this little Manual. I have been the more exact and particular in laying down the Rules, and in assigning the Reasons of them, for the Supply of the imaginary Defect above. Insomuch that I think I have rendered every thing clear, plain, and intelligible to the very meanest Capacity. For I have penn'd it for the Service of the Farmer\*, as well as of the Gentleman\*; for the Use of the poor Rack-Holder, as well as for his rich and wealthy Lord. I have therefore endeavoured to put the Rules in such a Dress, and to express them in such Language, as to adapt them to the Taste and Comprehension of every Reader.

\* ——— *To thoughtful of your Gain,  
Not of my own, I all the live-long Day*  
No. 52.

*Consumed in Meditation deep, recluse  
From Human converse: nor, at shut of Eve  
Enjoy'd Repose: but oft at Midnight Lamp  
Ply'd my Brain. Racking Studies, if by Chance  
You I might counsel right. And oft this Care  
Disturb'd me slumb'ring. Will you then repine  
To labour for yourselves? And rather chuse  
To lie supinely, hoping Heav'n will bless  
Your Cyder thus neglected; or give Bread  
Unearn'd by Toil?*

PHILIPS.

But as Rules of all Kinds are jejune and dry; and a Sort of dead Letters, if there be not somewhat to quicken them: so I have intermixed Similitudes with them, and added a few Digressions to them, to divert the Reader, and to make them go down the better. Just as Apothecaries are wont to please and humour their Patients with gilded Pills. The Asa-Fœtida thus concealed, is taken by the nicest Ladies without Reluctance; though the Leaf-Gold is confessedly of no Manner of Use in Physick.

Some imperfect Draughts of this Essay have crept Abroad, and been well received, I hear, in many distant Parts of this Kingdom. For Strangers are always welcome, when they give the Masters of the House no Trouble; nor put them to any Expence in their Entertainment. But they are more especially so, when, besides the News they carry with them from their own Country, they offer to serve their Entertainers gratis; and without Meat, Drink, or Wages, to become Caterers for their Profit, as well as Pleasure.

If any of those few, whom I have obliged with the Rules for Improvement of their Cyder, do look upon Obligations of the same Kind to others, as an Infringement upon their Property, by thus breaking down the Enclosure, and turning the little Spot, as it were, into a Common: my Answer is, that I am very much mistaken, if I have ever yielded up the Possession into envious, mercenary, or selfish Hands. My Design in imparting it to a few, was, that it might be communicated to many, and so serve, in some Measure, the Ends of the Press; to which I had no Thoughts of committing it, had it not been suggested by a particular Friend, as a useful Article to be inserted in the Book of Husbandry. And I should be glad to hear, from my Readers in general, as I have already from those who have had the Manuscript Copies imparted to them, that they have as good Cyder of their own Growth, by a close Observance of these Rules, nay much better than they can meet with at the publick Markets from the SOUTH-HAMS, or HEREFORD.

I am well aware that this Tract will appear in the Book of Husbandry, like a Stranger in a Publick Theater. Some may cast a favourable Eye upon it; but others will look askint. There is one Class of Men in particular who will scarce forgive me, and from them I expect no Thanks. These are the Cyder Merchants: or such as make it their Trade to buy Cyder from the Pound, to manage and to sell it at LONDON, and other populous Places.

But when these Dealers consider, that although this Essay may prove of some Dis-service to their



particular Employments, or Way of Business: (as it will teach every Farmer how to cure his own Cyder at Home, without being put to the needless Expence of sending it to the publick Cellars for that Purpose) yet if it will turn to the Publick Benefit, by improving a considerable Branch of the National Revenue; they will, surely, shake Hands with me. At the worst they cannot be so severe upon me, as not to pardon an Attempt which so directly aims at the Publick Good. Yea, perhaps, they may herein espy something (how unwilling soever they may be to acknowledge it) which had before escaped their Observation: or for which they could not render a proper and substantial Reason.

But whether they will acknowledge this or not, it is certainly the Interest of every Nation, to carry their Home Manufactures to the highest Perfection they are capable of; that so they may live as independent of their Neighbours as possible; and also export the superfluous Products of their own Country to Foreign Markets.

But alas! while instead of improving our Cyder, so as to render it fit for our own Tables, and saleable Abroad, our Heads are only projecting how to get Foreign Liquors to mix with it, and so to spoil, instead of improving it, in that costly Way; we are burthened and overstocked with both, by a clandestine and destructive Trade with FRANCE, we part with our Money, and (which is still more valuable on the Score of the many Hands employed in the Woollen-Manufacture) sometimes with our Wool too: and so keep our Enemies warm against External Colds, for several Years; while in Exchange, they only warm us within for a few Minutes. We please ourselves with the Name of SAMPSON (that is to say, Brandy and Cyder) but, like silly Prodigals, we wantonly part with the Golden Locks, in which our Strength doth lie.

I know it is a difficult Thing to stem the Tide of general Practice, and to persuade Men to any thing against their Inclination. It is like pressing upon them those hard Lessons in Religion of plucking out a right Eye, and cutting off a right Hand. It is a tearing up by the Root the darling Affections of their Heart.

To put an old Brandy Drinker, for Instance, under the Mortification of a total Abstinence, is like putting a Knife to his Throat, for he cannot live without it. He hath so over-heated his Constitution with this combustible Liquor, that Cyder, alas! is become too cold for him. He fancies that he should be dead soon, if he hath not something to warm and comfort his Heart; especially in cold and frosty Weather; upon a Journey; after hard Labour; and to keep him warm while he is so; at least to prevent his cooling too fast, and to keep his Blood from being chill'd. Yea, Brandy is become an Antidote for all Intemperance, both in eating and drinking; just as one Sort of Poison is prescribed by the Physician, for expelling another. Thus a Dram is exhibited by the Master of the Feast after a plentiful Dinner, or the Use of gross Food. It is the only Latin that we hear at Table for Pig and Goose in particular. It pinneth up the Basket, as we say, and becomes the last Glass at parting, after a Deluge of other Liquors. Yea,

Tea, and Punch itself, are fancied not to sit quite easy upon the Stomach, without a clean Dram for a Rider. Thus Brandy hath the good Luck to obtain the Fame of a Sovereign Cordial: of a Catholicon that hits every Disorder; that is suited to all Constitutions, to all Times, to all Places, and to all Occasions.

I have found many People in the World thus befooled to their Ruin, and have had an Account too of many more. But I am still sensible that the Corruption is not universal. I shall therefore think my Pains well bestowed, if they afford sufficient Caution to the uncorrupted Part of the present Generation, from falling into this fatal Snare, from whence their Friends or their Forefathers did confess it even impossible for them to recover.

But I must not leave such poor miserable Creatures as I find them. If they are not already so blinded and besotted by this intoxicating Liquor, as to be entirely lost to their Reason, I must beg them to consider that, instead of supporting their Spirits by Brandy, every Dram is a Sort of fresh Wound, or Stab inflicted upon themselves; and that therefore every such repeated Act of Suicide, or Self-Murder, doth require also a particular Act of Repentance to wash away the Guilt thereof.

Nor must I look upon them as incurable, and so forsake them; as the Physician uncourteously turns his Back to his Patient, when he finds the cold Sweat upon him. For though the Disease of Brandy-drinking may be reckoned of the most inflammatory Kind, and highly malignant: yet while there is Life there is Hope; and a Cure may be wrought without running the Risque of a dangerous Experiment, or a desperate Remedy.

As those who have enervated and blunted their Reason, by this stupifying Liquor, are rather to be taken by Guile and Artifice, than to be wrought upon by rational Inducements: so I would recommend to them the pretty Device of a Dutch Doctor, upon the like Occasion.

Finding his Patient too far gone in the Phrensy of drinking Brandy, to be cured of the ill Effects of it by Physick: that his Appetite to Food failed him; that his Pulse was quick and intermitting; that he had a Cough upon him; and that he had all the Symptoms of Night Sweats approaching, and so of his entering upon the last Stage of a Consumption; the Doctor thought it expedient to remove the Cause of the Disease, instead of dosing him with Physick; and so weaned him gradually from that fatal Practice by this artful Stratagem. He did not debar him from his favourite Cordial at once, but indulged him the Use of it upon this easy Condition: namely, that he should strictly observe to put a large Duck Shot into his usual Dram Glass, every Time before he took his Dose. For Lead, said the Doctor to him, is of a cooling, healing, balsamick Nature; and therefore good to refresh and strengthen his weak and tender Lungs. By the frequent Addition of Shot, and their Continuance in the Glass with some of the Liquor, under Pretence of Infusion, for an Hour, (according to the Doctor's Direction) the Dose was reduced at last to the Quantity of a Tea.



Tea-spoonful; and by that Means he both reclaimed and recovered his Patient. For he grew well in Proportion to the gradual Diminution of his Dose. A very honest and cheap Prescription for the Cure of this wretched Malady of Dram-drinking. Not as other Sorts of Madness are cured, by Evacuations of all Kinds; by the tedious and painful Experiments of Cupping, Bleeding, Blistering, Vomiting, and Purging; and sometimes by the Correction of Chains too: but by the imperceptible, and daily Abatement of the wonted Superfluities of the Glass; and by a slight Curb, and easy Restraint upon an insatiable Appetite of Liquor. And thus the Vices of the Mind, as well as the Diseases of the Body, are best cured by Practices opposite to those that begot them.

The Usefulness of this Subject of Cyder must apologize for my having stepped out of my Profession to treat of. And if an IRISH Prelate hath condescended, for the Good of his Country, to enter into a Minute and Philosophical Examination of the Virtues of Tar-Water; and to extract a Panacea from the inspissated Juice of an Exotick Tree: why should a poor ENGLISH Vicar be deprived of the Pleasure, or be debarred the Liberty of casting his Mite into the Publick Treasury, by improving a Liquor of our own Growth, and of which we have such a vast Consumption among us?

The Rules laid down in the Beginning of this Essay I have fully experienced, in a Course of many Years Residence in the SOUTH-HAMS. When others have found as good Success in the Observance of them as I have met with, by rendering their Cyder from Fifteen Shillings a Hogshead, (the prime Cost at the Pound) worth Five Guineas; yea, as valuable as an Hogshead of Wine (each of which I have actually refused for a Hogshead of CORNISH Cyder) they will, at least think themselves so much obliged to me, as to say; that neither their Labour, nor my own, hath been ill-bestowed. I have received the thankful Acknowledgments of many, who have frankly declared, that their Cyder, which before used to be thin, poor, and hungry, hath, by their following these Directions, proved so rich, full, and good, that their Friends (especially those who have been bred in the Maritime Way) have, during the Summer Season, called for it at Table, and preferred it to the best of Port-Wine: and, in plain Terms, they reckon it a valuable Article in House-keeping.

But I must be so sincere with my Reader, as to acquaint him, that those who have followed my Rules but in Part, and who have been diverted by a Multiplicity of Business, Company, Recreation, or Pleasure, from giving a due Attendance to their Cyder, they have found themselves much deceived in their Expectations, when it was too late to amend their Fault. Like heedless Practitioners in Physick, who dismiss their Patients with a single Phlebotomy, and Box of Pills, and take no farther Care about them, till their whole Mass of Blood is corrupted, and their Constitutions are quite emaciated. But although, in chusing an Afs for their next Doctor, the Patients may happen to be restored, by the Balsamick Milk of that, otherwise con-

temptible, Creature, to a tolerable Share of Health: yet the Cyder is gone (as we say) past Recovery, and beyond the Art of Man to cure.

But as this Dissertation is intended for the Benefit of my Country in general, and more especially for the Use and Service of those Parts of the Kingdom which do most abound with Cyder: so it would sorely grieve me to hear that an ill Use is made of it. It would much trouble me, I say, if some leading Member of Parliament, who is not a Representative for a Borough in DEVON, HEREFORD, or CORNWALL, should, in the Vacancy of State-Affairs, have the Curiosity as well as Leisure, to cast his sagacious Eye upon it; and so, in Envy to the singular Happiness of the few Counties famed for Cyder, should be tempted to move for an additional Duty upon it, in some future Session. For, if repeated Struggles have been made in the House of Commons, about taxing the Juice of the Apple as a Potable only: to what Height may the Debates rise, when a second Sir R—R shall appear there; and, with all the Flow, Grace, Dignity, and Force of Senatorial Eloquence, shall move and suggest, that Apples do not only supply us with Meat and Drink, but that they serve us also for Physick as well as Food.

For that the Apple affords a healthful Nourishment, is evident not only from the Foreign Examples of the POMERANIANS, cited above out of Dr. BAYNARD; but also from Instances near at Hand, of the Inhabitants of the SOUTH-HAMS (where the Seeds of this imperfect Essay did at first appear) and of the County of HEREFORD (which was the Scene of Mr. PHILIPS's Poem on the same Subject.) For as Apples, cooked up in various Forms, are a considerable Part of their Food from the End of JULY to the Beginning of DECEMBER: so Cyder is their principal and constant Liquor throughout the Year. And yet a more healthy Body of Men, or more cheerful in their Way, and truly merry in their Computations, cannot be found throughout the Kingdom.

*\* The Farmer's Friends, at thirsty Hour of Dusk  
Come uninvited: be, with bounteous Hand,  
Imparts his smocking Vintage, sweet Reward  
Of his own Industry. The Nut-brown Jugg  
Circles incessant, whilst the humble Cell  
With quiv'ring Laughs, and rural Jest resounds.  
Ease, and Content, and undissembled Love  
Shine in each Face: the Thoughts of Labour past  
Encrease their Joy. —————  
Gladsome they quaff, yet not exceed the Bounds  
Of healthful Temperance, nor steal from Night,  
Season of Rest: but well bedew'd repair  
Each to his House with unsupplanted Feet.  
Ere Heaven's emblazon'd by the Rosic Morn,  
Domestick Cares awake them. Brisk they rise  
Refresh'd, and lively with the Joys that flow  
From amicable Talk, and moderate Cups  
Thus sweetly interchang'd. No noisy Brawls  
Arise from social Glass. May BRITONS all,  
Remote from brazen Sound of War, enjoy  
Nectarous Cyder, and with seemly Draughts,  
Enkindle Mirth, and hospitable Love.*

But



*But let them thank  
That Providence which annually supplies  
Their Cellars, and with her rare liquid Gifts  
Exhilarates their languid Minds, within  
The Golden Mean confined: beyond there's nought  
Of Health or Pleasure found. But when thy Heart  
Dilates with fervent Joys, and eager Soul  
Prompts to pursue the sparkling Glass, be sure  
'Tis Time to shun it. If thou wilt prolong  
Dire Computation, forthwith Reason yields  
Her Empire to Confusion, and Mis-Rule,  
And vain Debates. Then twenty Tongues at once  
Conspire in senseless Jargon: nought is heard  
But Din, and various Clamour, and mad Rant:  
Distrust and Jealousy to these succeed,  
And Anger kindling Taunt; the certain Bane  
Of well-knit Friendship. Now horrid Frays  
Commence: the Bumper-Glasses now are hurl'd  
With dire Intent: Bottles with Bottles clash  
In rude Encounter: round their Temples fly  
The sharp-edg'd Fragments: down their batter'd  
Cheeks  
Mix'd Gore and Cyder flow. Ye Heav'nly Powers  
From BRITISH Isles such dire Events remove  
Far distant; neither let our civil Broils  
Ferment from social Cups! May we enjoy  
Our humid Products, and with temp'rate Draught  
Enkindle Mirth and hospitable Love!*

PHILIPS.

But it must also be noted, that when they happen to take a cheerful Cup, they commonly know their Quantum Sufficit, wind up their Bottoms, and either return to their Labour, or to their Rest. Thus they enjoy an almost uninterrupted Health: feed (as we say) like Farmers; and avoid those Excesses by which the intemperate Part of Mankind are led into many Inconveniences; to the Ruin of themselves, of their Fortunes, and of their Families.

If any should here observe, that I have overshoot my Mark, and that Cyder, Sobriety, and Temperance are very distant Subjects; I have this to plead: that in directing People how to make their Cyder better I should have done them more Hurt than Good, unless a seasonable Caution had been interposed and interwoven, if I may speak in the Phrase of a Woollen Manufacturer, with the several Threads of this Essay, to make the Drinkers of this Liquor to become better also. To render their Cyder more palatable, would be only laying a more subtil Snare to entrap them, unless I had also pressed and recommended a temperate Use of it.

The ENGLISH are, by their very Enemies, acknowledged to be a brave and a warlike People. Even the King of FRANCE (if Credit may be given to the Publick Papers) allows them to have Hearts, though he is pleased to deny them Heads. And it must be confess'd indeed, that ENGLISH Heads are mightily injured, but not totally destroyed, by FRENCH Brandy. His Majesty therefore may be said to deal by us as the PHILISTINES did by SAMPSON; first to blind us by his intoxicating Spirits, and then to jest upon, and make Sport with us. But when we recover from this Lethargick Fit, as SAMPSON'S Hair grew again, and his Strength with it, the Pillars of absolute Monarchy may possibly shake, as

those of the Temple of DACON were removed by the Hands of the Giant; avenging himself at once upon the PHILISTINES, for their unseasonable Mirth, and for the Loss of his two Eyes.

I do not speak this to exasperate our Military Men; but to imprint in their Minds this seasonable and certain Truth: that if they were as sober as they are naturally brave, they would excel in every Station of Life. They would shine both in a Council of War, and in the Field of Action. Their Enemies would no more come near them in the Stratagems, than they are able to withstand them in the Exploits of War.

That excellent Rule, he that striveth for Mastery is Temperate in all Things, is as needful to be observed in the Carnal, as in the Spiritual Warfare. A sober Warrior keeps his Reason cool, awake, and considerate. He hath the free Use of all the Powers and Faculties both of Mind and Body. His Head is as quick to distinguish and contrive, as his Eye to espy, and his Hand to execute. He soon discerns the most weak, open, and unguarded Parts of his Enemy's Troops, or the least Defects in their Fortifications: and as boldly pusheth his Way thro' their Ranks, forceth their Lines, or mounteth a Breach. By the Rules of Temperance (the Sister of Fortitude and Prudence) thus steering his Course, as the Sun doth by the Zodiack, like that glorious Luminary he is bright in all his Faculties, indefatigable in the Charge assigned him, and rejoiceth as a Giant to run his Course. In this active, yet unwearied Manner, methought I beheld with grateful Eyes, in the last War, our BRITISH Hero traversing Sea and Land; and no sooner leaving FLANDERS, than appearing in the memorable Field of \* CULLODEN, and charging the insulting Rebels with such undaunted Bravery (in Defiance of their once formidable Back-Swords) as to put them to a perpetual Flight, we hope, as well as Shame.

\* ————— Here might you see  
Lairds, and their Clans on the embattled Field  
Slain, or half dead, in one huge ghastly Heap  
Promiscuously amass: with dismal Groans,  
Ejaculations in the Pangs of Death!  
Some call for Aid neglected: some o'erturn'd  
In the fierce Shock, lie gasping and expire,  
Trampled by fiery Coursers. Horror thus,  
And wild Uproar, and Desolation reign'd  
Unrespited. The young Adventurer  
With long-stretch'd hasty Strides forsakes his Host,  
Trembling, agast, not venturing to look back,  
Posting for FRANCE: but leaves the envied Crown  
behind,  
His Title and Descent best prov'd by Flight:  
Witness thou BOYNE: and witness CULLODEN ———  
May GEORGE'S Crown long flourish on his Head  
In spite of FRANCE and ROME! May CUMBER-  
LAND  
Continue long to guard his Father's Throne!

On the contrary, if we take a View of Sottishness, we shall find it the Parent of those twin Sisters, Folly and Cowardice. The Person addicted to it cannot have his Senses nor his Intellectuals clear. His Head is filled with gross Fumes, and his Understanding clouded. A Mist continually obscures and veils his Reason. The

Virtues



Virtues of his Soul are lulled asleep; and he is hush'd and becalm'd into Ruin. His Bodily, as well as Rational Faculties, are brought into Bondage, and laid in Chains of Iron. He becomes weak and enervated in both: and the Soldier in this Condition, like his Drum without Braces, is unfit for the Battle.

Should I here pass over the BRITISH Sailors, they would rage and storm upon me, as not thinking them worth my Notice: though I really esteem them as a very valuable and a very useful Body of Men: and the more I know them the greater Reason I find to respect them. Among Friends Freedom of Speech is allowable, and the honest Tars cannot blame me for wishing, that they were to be reclaimed by Reflexions of this Nature. But alas! they are such a merry, thoughtless, jovial Crew, that they are only to be cured by Time and by dear-bought Experience. They are such an active, and yet such an idle Sort of Men; so averse to Fatigue and Labour, and yet so fond of running into the most busy Scenes of Life: so profuse of Money, and yet so often hazarding their Lives for it: so fam'd, in short, for the Extremes of Activity and Indolence, of the eager Thirst after, and the visible Contempt of, Gain, that they seem a perfect Riddle, and to surpass all Description.

But amidst such various Contrasts as center in their single Character, the Courage of ENGLISH Sailors doth either atone for all their Failings, in the Eye of their Fellow-Subjects, or casteth a favourable Covering over them. Their Valour is not to be paralleled among the Maritime Tribe; and no more admits of Contradiction, than it will submit to Opposition. I can compare them to nothing better than to ENGLISH Cocks, which, though they exceed all others upon the Pit, can yet contentedly riot upon a Dung-Hill.

But, to their Honour be it spoken, considering the many Hardships and Difficulties which they had to contend with in the last War, they sometimes even out-did themselves, and performed Wonders. Though, like the finny Tribe, they derive their Livelihood from the floating, turbulent, unsteady Element, and their Bread is cast upon the Waters: yet they have been often obliged to pull it out of the Fire too. As if they could not enough distinguish their Bravery without courting Danger, they have often engaged betwixt a double or treble Fire of the Enemies Cannon; that so, like that very Gold which they at once covet and despise, they might by such a Purification, appear with the greater Lustre. Yea, when they have been over-powered by a much superior Force, they have disdained to strike to FRENCH Colours, but in the last Extremity; and when their wooden Castles became so leaky, that the Deep was ready to swallow them up. But, amidst all their brave Engagements, and their many signal Feats at Sea, it is reasonable still to suppose that they would have performed more, had the common Sailors been as sober and temperate as many of the Commanders and inferior Officers, under whom they fought.

But among all the valiant Exploits at Sea, I should be wanting, in Respect to my quondam

Parishioner Captain PHILIPS, did I omit to mention his gallant Resolution in cutting an ENGLISH Man of War out of a FRENCH Harbour. An Action not unlike that of JASON, so much celebrated in antient History: the bringing back the SOLEBAY, together with two Hundred and fifteen FRENCH Prisoners in it, from the Road of St. MARTIN's, being, to all Human Appearance, as impracticable as the fetching the Golden Fleece from COLCHOS.

As this Action stands singular in the ENGLISH Annals, so the BRITISH Argonaut's Misfortune was singular likewise. For his not being bred in the Navy excluded him, by the Rules thereof, from the just Reward of his Merit. His Majesty, however, was graciously pleased to distinguish him, and to bind him, as it were, by the strongest and most significant Tie of his Royal Bounty: namely, by a Gold Medal affixed to, and pendent on, a treble Gold Chain. But the Command of his own Prize was what he had at Heart; as it would have afforded him more Room for the Display of that Bravery, which, for want of a stouter Ship, he afterwards signalized upon the INDIAN Coast, in a diminutive Packet-Boat.

Having thus paid my Acknowledgments to the ENGLISH Soldiers and Sailors, it would be but a low Compliment passed upon them to say, FRENCH Brandy is not good enough for them. Could I render ENGLISH Cyder like the famed Nectar and Ambrosia of the Heathen Gods; or the more modern, but no less fictitious Liquors of Aurum Potabile, to make them immortal, and so to cause their Lives to be as durable as their Fame, I should not think it above their Desert. But, as they would still covet a Sip of the right Nants, or Coniack: so, if a Cordial Whet is to be indulged to any who are not under an actual Deliquium; those surely have the best Title to it who fight our Battles: and who, upon a Push, may require just as much as will suffice to blunt the sharp Sense of Danger, to quicken their Spirits, and to push them on to Action.

But let them ever remember, that true Fortitude cannot be instilled from the Alembick. It flows from a much nobler Fountain; namely, from the steady and immutable Principles of Religion: which arms its true Professors with Courage in all Extremities. It will not permit them tamely to yield unto, or sneakingly to draw back in, the most threatening Dangers: where the Rights and Interest of their King and Country do demand their Assistance. For "Christian Heroes (to use the Words of a late \* Military Person upon the same Subject) will expire in Heaps before his Pavilion, to guard the important Life of their Sovereign; and, in the joint Cause of Heaven and Earth; of our Religion and Liberties, destroy like ministering Angels, or die an Army of Martyrs."

When the Reader considers that we are just upon the Brink of a bloody War, he will pardon a Digression, which is meant to whet the Courage, and to fix the Resolutions of those, who are like to be concerned in the most busy Scenes of it. And howsoever the ENGLISH may be represented by a neighbouring Power (like POLY-

\* Mr. Steele's Christian Hero.



PHEMUS in LUCIAN) strong, but blind: yet we trust that (through the Goodness of that Providence which hath ever befriended us) we shall be supplied with the Eyes of ARGUS, to watch and direct the State, as well as with the Hands of BRIAREUS to fight our Battles.

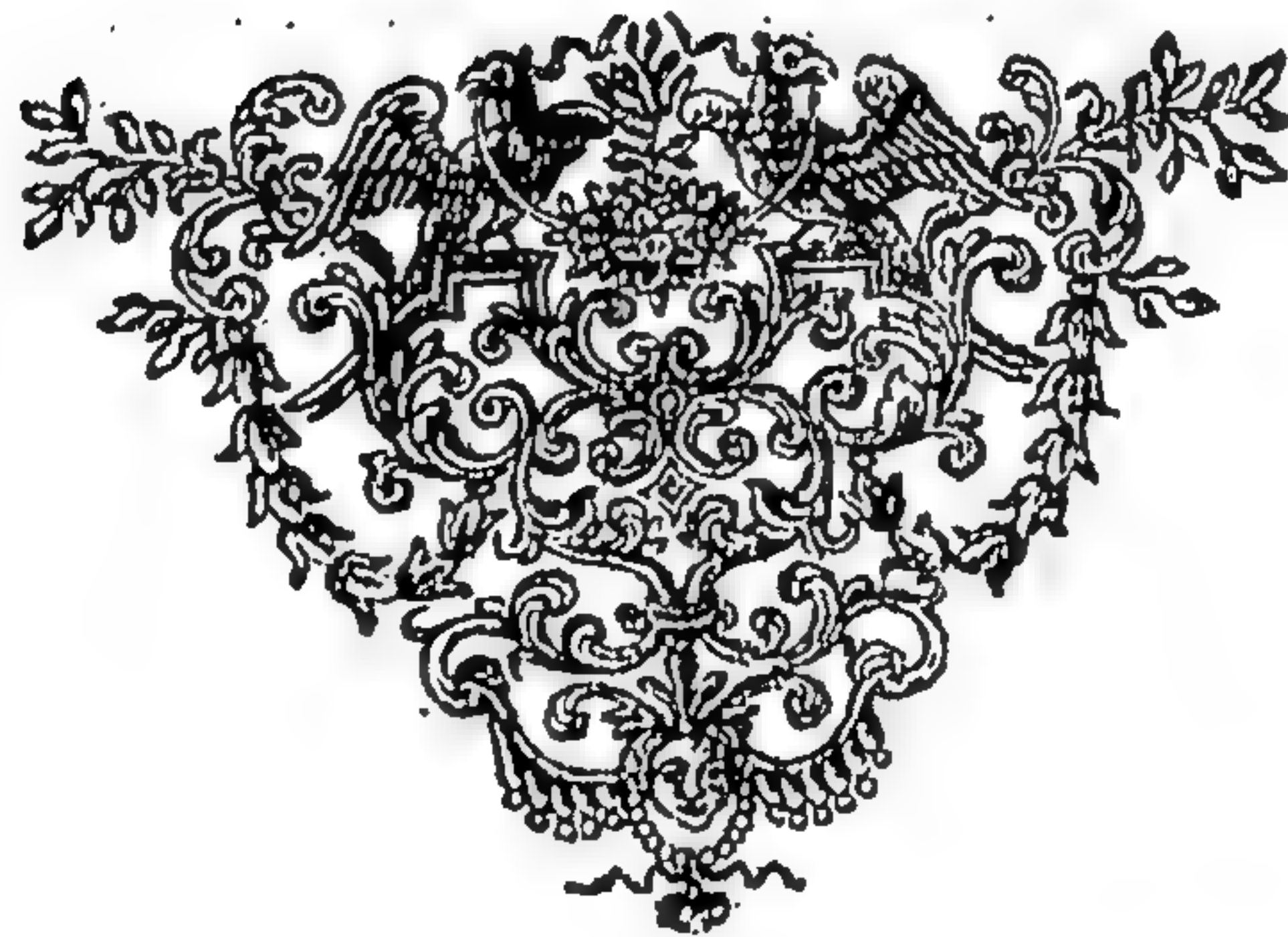
A Change of Topicks in Writing, as well as of Business in Husbandry, serves for Amusement. If these Political Remarks do not afford the Reader that Sort of Entertainment, which the Title Page gave him Reason to expect throughout the whole Essay; I must frankly confess that the Subject is of such a barren Nature, and lies so much out of the common Way of Writing, that, like the Apple itself, it will not afford any Juice without squeezing. I have therefore been sometimes at a Loss even for Words to cloath and convey my Sentiments in, so as to render them intelligible. For Cyder, though a liquid Substance, is yet a very dry Subject to write upon. Hence it came to pass, that in his celebrated Poem upon it, Mr. Philips, though a Writer of a very lively Fancy, found himself obliged to make many Excursions into Similitudes, Personal Characters, and other Amplifications, quite foreign to his Favourite Nectarian Juice. Some of his Observations I have referred

to; and they are set down without mentioning the particular Page. Since the Review of the first Manuscript Copies, many fresh Hints have started up, which are inserted here. They could not, without some Reluctance, be either prevented or suppressed: the Conceptions of the Mind being like those of the Body; and, when once formed into a Fœtus, the Burden encreases daily.

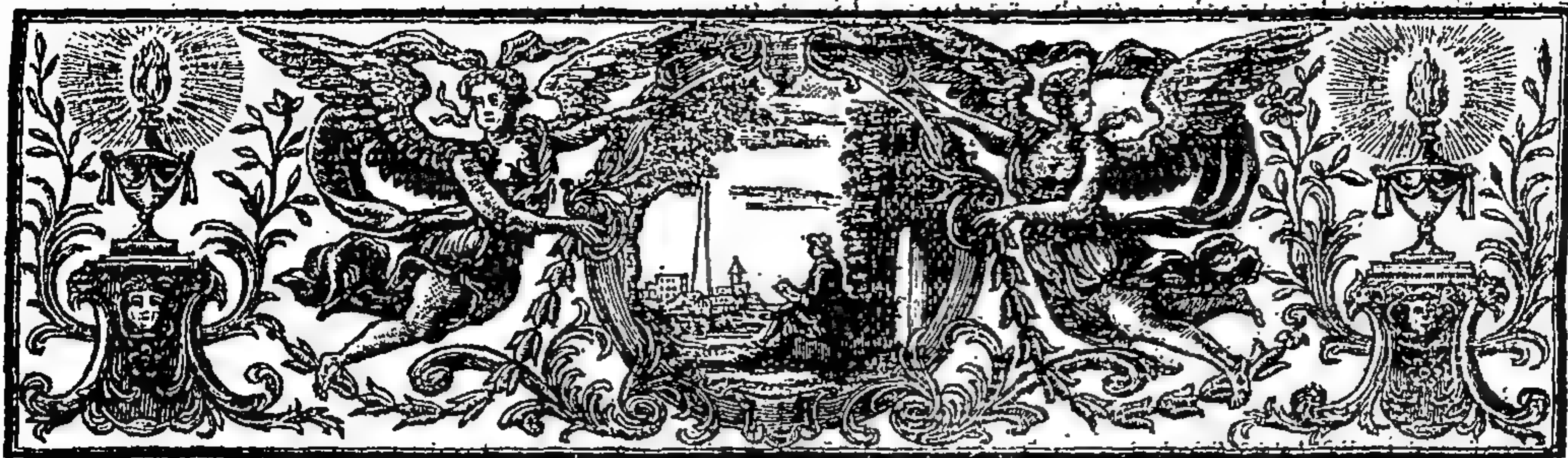
Several worthy Gentlemen have desired to see these Cyder Directions printed for the common Good; and have offered a handsome Encouragement for their Publication by Subscription. But when I made a Motion to one or two of them, for their Patronage of them, they modestly refused to have their Names prefixed to an Art, which they did not pretend to have the Skill to protect, because they did not understand the Art itself.

The Vessel is therefore launched, without a Pilot, into a wide Ocean of Contradictions: into a World of Yeas and Nays: of Commendation and Blame: of good Report and evil Report: of Praise and Calumny. As it is thus committed to the Rage of Wind and Storm, it only remains that I wish it a prosperous Voyage, for the Benefit of Posterity; and so I bid it Adieu.

End of the ELEVENTH BOOK.







A  
COMPLEAT BODY  
OF  
HUSBANDRY.

BOOK XII.

*Of the Accidents to which the Cattle and the Crops are liable.*

CHAP.

1. Of Heat considered in itself, and its Effects on the Stock and Crop.
2. Of Drought, its Nature and Effects.
3. Of the Care of Fields in the Management of Shelter.
4. Of suiting the Crop to the Soil to prevent the Effects of Drought.
5. Of the Effect of Drought on Trees, and the Way to defend them from it.
6. Of preserving Water for Cattle in Seasons of Drought.
7. Of obtaining Supplies of Water when the common Ponds are dry.
8. Of the Signs and Notices of Drought to be observed by the Farmer.
9. Of Rains.
10. Of the Signs and Notices of Rain to be observed by the Farmer.
11. Of the several Signs of fair Weather.
12. Of Hail.
13. Of Snow.
14. Of Winds.

CHAP.

15. Of the Signs by which Winds may be foreknown.
16. Of the Damages done by Winds to Husbandmen in their Crops.
17. Of the Nature of Blights.
18. Of the antient and modern Opinions concerning Blights.
19. Of the real Cause and Origin of Blights.
20. Of Damages by easterly Winds.
21. Of Damages by late Frosts.
22. Of Damages from Weakness and Starving.
23. Of the Nature of Mildew.
24. Of the real Cause of Mildew.
25. Of the Prevention of Mildew.
26. Of the Remedies of Mildew.
27. Of Smuttiness of Corn.
28. Of the real Cause of Smut.
29. Of the Prevention of Smuttiness by a due Care of the Land.
30. Of the Prevention of Smut by a prudent Method in sowing.
31. Of preparing the Seed against a smutty Crop.
32. Of the cleaning of smutty Corn.

THE INTRODUCTION.



AS it has been our Custom in the preceding Parts of this Work, not only to inform the Husbandman of such Things as it is necessary for him to know; but to explain them as minutely and exactly as we are able, that by being familiar to his Understanding, they might be imprinted in the more lasting Manner on his Memory: we shall endeavour to prosecute the same Method here, though in this Case more

difficult than any other. There is the more Reason for attempting it, because such a Knowledge is in no other Article so necessary. The Accidents we are about to treat of are of the most important Kind; and if the Causes of them be not properly understood, they never can be prevented. For this Reason, we shall in the first Chapters of this Book examine into, and so far as that can be done, explain to the Husbandman the Nature of such Incidents in the Air and Elements which are the Occasions of many of them; that



that by understanding in what Manner the Hurt is done, he may know what are the Means in his Power, if there be any, to prevent or guard against it.

Under this Division we shall also consider the Meteors, as the Learned call them, Rain, Hail, Snow, and the Rest; and instruct our Husbandman how far he may be able to foresee them, and consequently be prepared to guard his Flock and his Crops against the Danger they naturally would receive from them.

After we have thus enquired into the Causes, we shall trace the Effects in those Disorders they occasion in the several Parts of the Husbandman's Concern; and thus endeavour, under this most important Head, to lay down in a few plain Words a System of *Rural Philosophy*; which if not enough to satisfy the utmost Curiosity of idle Minds, shall yet offer every Assistance that has been discovered to serve the practical Farmer.



## CHAP. I.

*Of Heat considered in itself, and its Effects on the Stock and Crop.*

**T**HOUGH Heat be the very Principle of Life in the Universe, yet it may be attended with fatal Consequences to every Thing in Nature. The Degree determines the Utility of every Thing; and in the present Case, that which when moderate is the Support and Preservation of all Things, when excessive is their Destruction.

We are not here to enter into the Effects of Heat in the Condition of actual Fire, which dissolves, dissipates, or destroys all known Substances; but that Degree of it only, which may be in the Temperature of the Air. The Farmer will not bring Metals to the Furnace, nor expose Gold or Diamonds to the Power of great Burning-Glasses, which in their full Force scatter the one, and split the other to Shivers: these are the Amusements of Philosophy; we are concerned only with its Use. We shall confine ourselves to the Nature and Effects of that Degree of Heat which is at times felt in the Air, and to its Influence upon the Cattle and Produce of the Ground: and as we limit this Work to the Service of the Farmer, we shall advance nothing but what stands on certain Proof, and what his Reason will find it easy to comprehend.

Our Island is subject in the Summer Months to very considerable Heat, when Accidents conspire to continue it unallayed. Nature has so well adapted the Creatures of the Island to this, that they are none of them destroyed by it; nor the smallest Plant, unless irregularly exposed to it: but its Effects are very hurtful, though not so great as utterly to kill them. We see Cattle fainting and losing their Flesh, and Plants fading and drooping, according to the Degree of the Heat; and this the Farmer is with his Care to prevent, by Shade and Shelter for the one, and by watering the other when needful.

Many Plants, and most Animals, bear the Effect of Cold better than that of Heat, for this

plain Reason, that the Cold only condenses their Juices, whereas the Heat dissipates them.

The Effects of this Temperature of the Air are more sensible on Plants than Animals; wherefore we shall principally consider them in that Light.

Many Plants will grow in a very considerable Degree of Cold: but when it comes to freezing, tho' a Multitude endure it and keep alive, yet few have the Vigour to shoot. The slightest Frost stops the Growth of most Plants, and a Degree somewhat stronger it stops that of all.

This is a Principle perfectly established by Experience, and the Farmer will learn from it what he is to expect with Regard to his Winter Crop.

Young Plants suffer more by Frost than those somewhat advanced in Growth; therefore let him provide for such as are to stand the Winter accordingly, and expect from them Nothing but what Nature will support. Let him sow them in such Time in Autumn, that they may have some Strength before the Coming in of Frosts; and let him expect little more from them during Winter, than to establish themselves well in the Ground. In the Days of Frost he sees they can only support themselves alive, for to grow in that Time is against the Course of Nature; therefore what little Shoots they can make must only be during the open Weather; and these will be so checked by the Return of the Frosts, that there cannot be any great Progress.

As Nature has provided for the supporting the Generality of Plants alive during the coldest Weather we have in this Island, we are to be under no farther Concern on that Head; but to examine the various Degrees of Warmth and Heat; rising from this, to the Extream of what our Seasons afford.

The Warmth of the softer Winter Months brings Plants a little forward; the gentle Heat of the Spring makes them shoot apace; the greater Heat of Summer ripens their Flowers and Seeds; and even the greatest as we have shewn is not enough to destroy them, unless the Negligence of the Husbandman join with it.

A gentle Warmth puts the Sap of Plants in Motion; and the greatest Power of it within Moderation, unites and cements their best Juices for the Formation of their most useful Products: but when we come to a Degree any thing considerably greater than this, it operates in a Way directly contrary to what we have named, separating and dispersing their best Particles, instead of bringing and uniting them together. It is therefore a Plant pushes out its Flowers, and ripens its Fruit or Seed in this moderate Degree of Heat; but in the Extream fades and decays.

Many a Crop that might have produced very well is lost, or comes to little, for Want of the Farmer's proper Assistance. Different Soils and different Situations make Plants bear Heat differently, some better, others worse; as also their several Kinds. We have told the Husbandman what Species suit what Soils and Exposures best, having always kept this Article of Heat in Mind; and with proper Regulation there is scarce any such Thing as a Crop's utterly failing this Account. When we consider how much hotter some Countries are than ours, this will appear



pear less strange; for there are Plants which live in the hottest of them.

Experiment shews what would scarce else be credible; respecting this Article, Dr. HALES, whose Veracity or Accuracy never have been or will be questioned, asserts, that Plants will endure without Prejudice a greater Degree of Heat, than that of Water made as hot as that a Person can but just endure to hold his Hand in it without stirring it about. He has therefore fixed upon a larger Degree of Heat than this for the utmost which Plants will bear, and ascertains it at that Heat of Water upon which melted Bees-Wax begins to harden.

This is an Experiment very happily chosen, since Bees-Wax being a vegetable Juice, tho' collected by the Bee, such a Degree of Heat as would absolutely dissolve that, must be the utmost Point Plants can bear.

This explains to the Farmer how much his own Neglect is to be blamed at many Times, when he gives up his Crop as spoiled by Heat: this is a Degree of it to which Plants never will be naturally exposed with us: therefore he may for his Satisfaction establish this Maxim; that if he conduct himself properly in all the Articles we have named, in the sowing and Management of any Crop, it will never be lost by Means of the Heat.

If a Weather-Glass of the common Make be divided into a hundred Parts from the Degree of Cold at freezing, to this Degree of Heat determined by the melted Wax, it will give all the Degrees of Heat to which Plants will ever have any Reference. Few Houses are without a Weather-Glass, and the Farmers never should. The Kind made for this Purpose is that called a Thermometer, and the Husbandman will do well to have one with this Division, which will come as cheap as any other. This will shew him at all Times what is the Degree of Heat in the Air, much better than what he feels at random by his Body; and according to this he will know in what Degree of Health, or in what Danger his Crop is from this Article.

In a Space thus divided, sixty-four Degrees is about the Heat of the Blood in Animals. Experiments have shewn, that the Heat of the external Part of the Body is that of about fifty-four of these Degrees: the Heat of Milk as it comes from the Cow is fifty-five Degrees; which Degree is about the same that serves for the hatching of Eggs; and that of new made Urine is about fifty-eight.

These Degrees of Heat being known, with Respect to the Parts and Bodies of Animals in Health, they give us a Mark by which to know their Sickness; and the Comparison of what Degree of Heat our Summers commonly afford, with what Plants will bear, which is perfectly known by this Method, will farther confirm to the Farmer what we have asserted already, that when his Crops fail, as is supposed by Heat, it is not by the absolute Effect of that, but by his Mismanagement joined with it.

The common Degree of temperate Weather in this Division is about eighteen Degrees; and the great Heats of Summer will raise it to eighty eight Degrees. This is a vast Advance; it is four

Numb. LIII.

and twenty Degrees hotter than the Blood of Animals naturally should be: but even this, though without Care it will make Cattle faint, and expose them to Disorders, yet is no less than twelve Degrees below the extreme Heat that Plants will bear without Prejudice, if they be properly managed.

There are Countries in which the Plants all endure this Degree of Heat many Months, for several Hours each Day, and more; but what is seen in them verifies what we have told the Husbandman. They hang their Leaves and fade, and would be killed by it, but that they are supported and refreshed by the great Dews of the Evenings and Nights in those Places.

Nature has for this Reason made many of the Plants of those hot Regions of such a Form, that they have no Leaves; these being the Part that suffers most readily by the Violence of Heat.

Though we have named the Height of eighty-eight Degrees, as what the Weather sometimes arrives at in our Summer, the Farmer is not to imagine that every Summer is so hot; much less that every Plant must of Necessity be exposed to such a Degree.

The common Heat of a Summer Day in the hotter Months, and in the Middle of the Day, is about fifty Degrees of this Measure. There is a great deal of Difference between this and the Heat marked at eighty-eight, which yet is twelve within what Plants may bear. But yet this is a Degree of Heat to which his Cattle are not exposed, tho' a great many Parts of his Crop are. At those Times when the Heat is at fifty Degrees in the Sun, which is to be called a Summer Noon-tide Heat, it is but thirty-eight Degrees in the Shade. The Farmer should carefully observe this Article, that he may see what a vast deal is in his Choice by a proper Management: 'Tis true that the great Heats of Summer subject his Cattle to many Disorders, as we shall presently see at large; but he sees here, that it is in his Power to moderate that Heat twelve Degrees in fifty by a proper Shade.

Motion encreases Heat to a very great Degree, therefore let him take care, that when the Days are hottest his Cattle are kept the most quiet. In the same Manner, as the Middle of the Day is the hottest Part of it, let them be kept particularly quiet during that Time. These are Rules founded on plain Reason and daily Experience, yet though plain and obvious they are not sufficiently regarded. The Husbandman may, by an irregular Proceeding, heat his Cattle as much in MAY, as the Nature of the Season would do in JULY: and on the other hand, by proper Hours of Rest, and due Shelter, he may in the Effect reduce the most extreme sultry Weather to the Condition of temperate.

With Respect of Plants, an Observation of the Degree of Heat, and of their general Condition and Progress, will shew abundantly the Truth of what was before asserted, respecting the Effect of a moderate Heat for promoting their Growth, and the Effect of a greater Degree of it in ripening their Seeds. At a Medium the Heat is in APRIL at about fifteen Degrees. This with the Assistance of the Rains at that Season sets the Plants to shooting. In MAY



and the Beginning of JUNE it advances from that to twenty, twenty-five and thirty Degrees; and in this Time they grow most, and strengthen themselves best. After this come the more extreme Heats, and the Seed ripens. In general the Degrees of Heat between twenty and thirty, are those most suited to the Growth of Plants. If we may be allowed to give a Sort of general Calculation for the Rest of the Year, we may say that the common Heat of the Beginning of Spring, and the Decline of Autumn, may be reckoned between ten Degrees and eighteen; and the Winter Heat within ten Degrees of the freezing Point.

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## CH A P. II.

### *Of Drought, its Nature and Effects.*

WHEN the Summer Months beside being extremely hot are also extremely dry, the Farmer's Crop never fails to suffer greatly, unless well assisted by Art. In the hottest Countries there are the largest Dews; and in the same Manner, in our hottest Seasons the greatest Quantity of Moisture is exhal'd from the Earth, and serves to refresh the Herbs again in its Fall; but it is not enough to preserve them in Vigour. Nature intended for them the Assistance of Rains, and when these are with-held, the Husbandman must supply the Defect by his Industry.

The Products of open Field Land are most exposed to the Damage that is sustain'd from Drought, and Corn more than Pasturage; yet none are exempt. In Seasons but slightly droughty the open Field Corn suffers, and the Farmer reaps but a poor Harvest; and in the Extream of this unfavourable Weather there is little Grass for the Cattle.

The Stock thus suffers by Means of the Scarcity of Food; and commonly there is great Want of Water for them at the same Time. These, added to the natural Disorder of their Bodies from the Heat itself, are Sources of many Disorders; so that it is a very important Concern to the Farmer to make the best Provision against the Damage that he can, and to do all he can to remedy it when it happens.

The Method of preventing the Effects of Drought is pointed out by Nature: indeed the Husbandman's whole Practice is so, if he would but follow her Steps. Let him ride about the Country in the Extrems of a droughty Season, and observe the Effects of it on Lands that lie differently. We have observed that it is in open Fields the Effect is worst; and in the others he will see the Damage less as the Enclosure is better. This may shew him that the proper Guard against the Accident of Drought, is by keeping up his Fences, and planting them well with Trees. We have spoke of this before, and recommended it very warmly upon the Consideration of its Advantage in Respect of Wood: here is another and a very great one. The Effect of the warm Sun upon Plants of the same Kind in open Ground, is ten Times greater to do them Harm, than in such a one as is well enclosed: we have shewn its Heat is greater,

but that is not all; Droughty Seasons are always attended with burning Winds: these parch up the Plants which the Heat only faded; and against these three joint Causes of Mischief no common Plant can well stand. 1. The Heat dissipates and evaporates a great Quantity of the Juices. 2. There is no Recruit from Showers for a Continuance of Time, and the Evaporation is all the while daily repeated; And, 3dly, The dry Winds follow, to shrivel up what the Sun had faded. These are natural Consequences; the Leaves wither and droop, no Moisture comes to refresh them, and Winds parch them up: they must fall off. We have, in a preceding Part of this Work, shewn what are the Nature and Uses of Leaves on Plants; and it is plain the Loss of them must be very destructive to the Whole.

We have laid down the Cause of the Mischief Plants receive from Drought, to shew the Farmer the Propriety and Necessity of what we are proposing by Way of Remedy. The Heat and Drought do their Damage but partially and ineffectually, unless the Winds come in to their Assistance. A Plant may droop and hang its Leaves from Day to Day for a considerable Time, and yet upon a small Shower it will recover: but when a parching Wind blows over it upon the Heat, in that drooping Condition the Leaves fall, and then no Rain recovers it to any Purpose.

Now the Exposure to these drying Winds appears to be the Thing that compleats the Destruction of the Plants; therefore the Farmer's Business is to guard against that. The Elements will not obey his Pleasure, but he may defend his Crop from this Mischief of Winds. The Sun will dart its Rays in Spite of all his Caution; and there is no Art by which he can make the Clouds drop their Treasures of Water: to these therefore he must submit; but the Mischief of these is but partial and ineffectual without the Winds that follow: and tho' he cannot prevent these, he can guard his Crop against them. To this Purpose let him thicken his Hedges at the Bottom, and plant Trees in Abundance, that will grow to a Height, and almost meet by their Branches all the Way up. This will be a Defence not only against the Winds, but in some Measure against the Sun. The Thickness at the lower Part will perfectly well break the Force of the former, and the large Shade spread over the Field for a great Part of the Day by one or other of the Hedges, will defend the Growth against the latter. The Plants thus sheltered will enjoy a State of the Air by many Degrees cooler, than if the Sun had its full Effect upon them: and there is another Advantage too little considered, which is, that the Number of Trees will, by the great Quantity of watery Matter they perspire, render the Air less scorching.

The Profit of Wood will also recommend this Method of Shelter, for it is very considerable: on all Accounts we advise the Farmer to fall into the Practice, but still within the Guidance of Moderation; tho' we advise him to thicken all his Hedges about those Places, where from the Situation Drought is like to be most destructive; yet we mean this should be done in a prudent Manner.



ner. The larger the Field the loftier should be the Trees. For common small Enclosures a well grown white Thorn Hedge, managed as we have directed, is a sufficient Defence: in those of a larger Extent the Pollard Hedge, of which we have given a Figure and Explanation from the Hand of an ingenious Correspondent, will be the most proper; and for the largest, tall Elms, and other Trees of the like Kind, which are to be indulged in spreading out their Side Branches, provided they do not over-hang the Ground too much, or starve the Head.

For this Purpose we shall advise the Farmer, in some Degree to imitate the Practice of the Gardener in his cutting of those Trees, which he means should grow fan Fashion. Let him cut off the Boughs of these Elms and other Trees that grow toward one or the other Field, and encourage such as run parallel with the Course of the Hedge. This will have a great Advantage: the Side Boughs will thicken, and will be a better Shelter and Defence, and the Growth will at the same Time suffer nothing from their Over-shadowing or Drippings. There must be always a fine leading Shoot left for the Top, to carry up each Tree in Height, while it is thus spreading Breadthwise; and with all the Advantage there will be a great deal of Beauty. This is a Thing not to be considered by the Husbandman, at the Expence of Convenience, but when it falls in with that, 'tis certainly worth Regard. The judicious Eye abhors the Gardiner's Practice of clipping up Trees in this Manner in strait Lines, Leaves and all, till they resemble a Wall, because it is stiff, formal, and out of Nature; but what we advise the Farmer to do, which is no more than cutting away such large Boughs as stand strait forward, will have a most pleasing Effect. There will arise from it a Flatness and Breadth sufficient to please the Eye, though not so formal as to offend it; and the remaining Branches will give the whole an Air of perfect Nature: such Trees will look only as if they had chanc'd to have grown very prettily. Every Field will thus have the Aspect of a Garden, only more natural and more beautiful.

### C H A P. III.

#### *Of the Care of the Fields in the Management of Shelter.*

THE Husbandman will see that we have thus contrived for him an easy, and a very effectual Remedy against the principal Danger rising from Drought; but he will naturally observe, that these Hedges must be cut, and these Trees lopp'd at Times; and it will be natural to ask, what is then to be the Defence of the Crop? The Answer is not difficult, nor is this any great Inconvenience. The Improvements introduced of late Years into Husbandry, give the Farmer a great Advantage in the Variety of Crops; and he will find that Change in no Respect more serviceable than the present.

There are Plants which will endure Drought much better than others; and these he must contrive to have upon his Lands at the Time when

he is to cut his Fences. This will not be difficult, because the cutting these is always in his own Choice; he may not only do it when he pleases, but he may know a Year or two before hand, and provide accordingly.

The general Rule is, that the deeper Plants root the better they resist Drought; and the Reason is very obvious, because Drought affects Herbs only in Proportion to their want of Resources against it, and these Resources are always greater the deeper they are sough. A little dry Weather will parch the Earth about a slight rooted Crop; but it must be a long Continuance indeed that can affect it to the Depth some of the new introduced Plants reach.

We have explained this Matter of the deep and shallow rooting of Plants in a preceding Part of this Work, therefore shall not repeat it here; but shall give the Husbandman this general and universal Caution, that he proportion the Growth to the Condition of the Shelter. He will always know at what Time it will be bare, at what Time it will have grown to a moderate Defence, and when it will be in its full Perfection: therefore let him, against such Years as the Shelter will be most perfect, sow those Crops that root the most slightly, and leave the Ground most open between them, for they will least of all bear Drought. This last-named Article is more important than is imagined, for the Earth parches much sooner where it is exposed between the Plants, than where their Branches shelter it; and on this depends greatly the different Effect of Corn and Pulse upon the Ground.

The Husbandman's own Discretion will carry him on to sow, for the Time of middle Growth of his Fences and Trees, such Crops as require a moderate Shelter; but will not very easily be parched up: but the great Consideration is with Respect to the Years in which the Fences will be barest. We have directed him to sow such a Crop as requires most Shelter, at that Time when the Hedges and Trees are thickest. We will suppose this the Year before the Trees are to be lopped; and the Hedges cut down: the next Season therefore is to be that in which the Fields will be left most of all exposed; and consequently, if a droughty Year come, the most disadvantageous.

Of all the Plants introduced into the Husbandman's Profession, Saintfoin is the deepest Rooted, and it best stands these Accidents; therefore let the Husbandman provide a Crop of this against the cutting of his Trees. Let him sow it early, and as it will then enjoy the Benefit of the thick Shelter while young, it will thrive so well as to establish itself in the Ground before the lopping and cutting. It may then be left to Nature: it will stand the Exposure made by this necessary cutting the Fences; and as it is a Crop that lasts several Years, it may very conveniently be continued upon the Ground while the Fences are growing up, and the Trees recovering their Branches. When they are grown so as to afford a good Shelter again, the Saintfoin may be broke up, and the Ground will be in excellent Condition for another Crop.

We have mentioned Saintfoin as an Instance, but the Farmer is not tied down to this only Plant,



Plant, he may take his Choice among all the deep Rooters, and they will bear this Management, serving him very well during the exposed Years, and preparing his Land for Corn.

It is well known that dry and barren Lands suffer the most from Drought: therefore this Care should be most of all taken with Respect to them: the Fences for them should be planted thick, and the Trees at small Distances in them; we have before given the Farmer his Choice of several that very happily suit such Soils. In many Parts of the Kingdom, since Inclosures have become more general, Lands that were worth little while open, are come to great Value by this Article of Defence. The Crops on these Lands are least able to bear parching Winds, and therefore they the most evidently of all shew the Effect and Benefit of Shelter; but this Effect on them is sufficient to recommend the Practice universally, where there is Danger of these Accidents.



#### CHAP. IV.

##### *Of suiting the Crop to the Soil, to prevent the Effects of Drought.*

**T**HERE are, as we have shewn, certain Soils which are more subject to have the Growth on them damaged by the Effect of Drought than others; and there are also certain Species which shew the Effect of those parching Winds, that attend this Accident more than others, and that are less able to bear it: these Considerations singly may be of Service to the judicious Husbandman, for providing against the Effects of this Temperature of the Elements; and when taken together, as we here propose to treat of them, they serve as a Kind of general Rule for his Practice.

We have advised him to look round about him, for the different Effects of the same Accidents on various Grounds: we shall now carry his Observation a little farther, and take in the State of Things in different Parts of the Kingdom.

We suppose the Farmer situated in some Spot where there are the common Accidents and common Advantages attending his Profession; but from thence we shall now carry his Observation to those Places where a great deal of the Land lies low, and in the Way of Damp and of Overflowing. The Soil in these Places, as we have before shewn, is usually a rich deep Mould; and where they have the Advantage of any tolerable Plantations about them, they are from their low Situation well sheltered.

In many Places Ditches are made to serve by Way of Fence. But this is an ill Practice on such Lands, for they are by this Means exposed to all the Damage of parching Winds. It is less than on dry barren Soils; but still it is considerable.

These Lands therefore we exclude from the present Observation: we speak of those which lie low, have a rich Mould for their Soil, and tolerable Shelter; of these there are Abundance

about the Borders of the Fens; and if these be examined in the Years of Drought, they will be found then loaded with the largest and richest Crops.

Hence a Rule of Practice is very easily to be deduced. If the Farmer have such Land divided by Ditches, and it bears poorly, while he sees that of his Neighbours produce well; let him plant the Sides of his Ditches with Willows at moderate Distances, and as they have naturally a naked Trunk, let him set Osiers between them. The Method of doing this we have delivered before, and the Effect in this Case will be very great. The tall Heads of the Willows will cast a proportioned Shade, and the Osiers, which are full of Leaves down to the Bottom, will keep off the Winds.

Only particular Crops will thrive where the Lands lie very low, which is usually the Case where there are these Ditch Partitions; but all these Crops will receive vast Benefit in dry Years from this Fence.

We have advised the raising of Saintfoin on the Ground, that is to be left exposed by the cutting of the Hedges, and lopping of the Trees; and we shall add, that on this Occasion it is the Farmer's Business to sow his Crops removed from those higher and more exposed Fields on this Occasion, upon the lowest Grounds he has; and those which are best sheltered.

The Saintfoin on the exposed Ground will so cover the Surface with its Branches, that if a hot and drouthy Summer follow, it will be much less affected by it; and the Herb receiving its Nourishment from a great Depth, will flourish, because the Sun will not have Power to affect it at that Depth, when the superficial Part is thus sheltered; while the high Grounds thus stand out a Year of Drought in their most defenceless State, with a good Crop upon them; the lower Lands will, according to their Nature, yield the best Crops of all.

On the contrary, if an unexpected wet Season happen, the Crop on the high Grounds will be the stronger and finer for it; and those on the lower Grounds must be assisted, as we shall shew when we come to that Head.



#### CHAP. V.

##### *Of the Effect of Drought on Trees, and the Way to defend them from it.*

**T**REES, like all other Products of the Earth, are liable to be affected greatly by Drought; but it is only while they are young: they are at that Time destroyed by it more easily than Plants of the herbaceous Kind; but when they are established in the Ground, they remain unhurt by its utmost Violence. In this Experience confirms what is so plain from Reason, in the Effect of Drought, upon deep and shallow rooted Products. The principal Effect of this Accident is on the Surface of the Ground; and when the Root of any thing pierces to a proper Depth, the whole remains unhurt by all that happens above Ground.

We have recommended planting of Trees in waste Grounds and in Hedges, and we shall here obviate



obviate the great Discouragement attending that Practice, which is the frequent failing of the Plantation from Drought.

We have, in treating of Planting, mentioned the several Accidents of Wind and the like, with the Way of guarding against them: these destroy many Trees, but Drought more than all: and this especially where the Plantation is made on an exposed barren Piece of Ground.

These are the Places where Trees would be most desirable, but from the frequent Failure of them Farmers have entertained a Notion they will not grow. That Nature can raise and support them in such Places is evident, because we see them wild and of fine Stature, though it is so difficult to make them thrive when a Plantation is intended on such Ground.

Let the Husbandman imitate Nature. That is, let him sow the Trees, of whatever Kind; and not plant them. And as we have told him what is the great Cause of their failing, let him guard properly against it.

The Practice of laying Stones or Rubbish about the Roots of new planted Trees, is very good, and may be also used for those raised from the Fruit; but we have prescribed a Method for the securing of smaller Crops from Drought, which may, under a proper Management, be transferred to these with great Advantage.

The young Tree is the only Consideration in this Case, for when established it is safe; therefore let a Defence be raised for it while in that State. It is easy to sow something of this Kind at the same Time with the Tree, and they will rise together.

It is true, every Shrub for Shelter will not thrive upon these barren Grounds where we propose Plantations, but there are enough that will. A poor Ground in an exposed Field is the proper Soil for Furze; for we see it on the worst Ground on the bleakest Heaths, and barrenest Hills, flourishing well. This therefore will grow from Seed in these Places, and nothing can be more proper for the Service. Therefore when the Husbandman sets about a Plantation on this Kind of Ground, let him, at a Distance round every Spot where he intends a Tree shall stand, sow a good Quantity of Furze Seed in a Circular Trench.

This will defend the young Shoot of the Tree from Winds, and also from Cattle. By this single Contrivance the Shoot will rise prosperously, and when it is out of Danger the Furze may be cut up for Use. Thus will a fair Plantation be raised by Nature's own Means; and it will succeed in the same Way as those which are established in like Places naturally. They have risen from the scattered Seeds or Fruits of the same Kind, and have stood their Chance and thrived without those Advantages, therefore doubtless these will do better.

If, after the Furze is removed, the Trees appear not to thrive well, from the Heat and Dryness of the Season, and from the Exposure, let the Farmer order a Bank of Earth a Foot and a half high, and a Yard broad, to be raised round the Bottom of every one of them, and they will immediately shew the good Effect of it in their reviving; this presses and strengthens the Earth

about their Roots; and it gives them, in some Degree, the Advantage of deep rooting, which we have observed to be the greatest of all Defences against Drought.

## C H A P. VI.

### *Of preserving Water for Cattle in Seasons of Drought.*

WHILE the Crop suffers by the want of Rain, the Stock of the Farmer will be endangered by the drying up of the common Reservoirs of Water: the utmost Care is therefore to be taken to preserve what there naturally is; and to obtain more from other Sources when that no longer serves.

The common watering Places for Cattle, where there is not the Advantage of Brooks and Rivers, are certain Pits deeper or shallower, dug purposely, or on other Occasions, which receive the Rain of the wet Months from the higher Ground; and preserve it during Summer. These are so essential a Part of the Farmer's Concern, that they must never be neglected.

Let him take Care to clean them at proper Times, that there may always be a due Cavity or Depth for receiving the full Quantity of Water. The Mud thrown out of them will pay the Labour, so it is doubly wrong to neglect it.

Let him examine whether they be well situated, and consider whether they be of sufficient Bigness. If they are not in the best Places let him have others dug where they should be; and if they be well placed, but too small, let them be sufficiently enlarged.

The Observation of one Season, especially if it be a dry Year, will inform him how to judge in this Particular.

When the Pits are well placed, and of a due Size, let him observe how they hold the Water. If they become dry in the Time when they are most wanted, let him look into the Cause, and grudge no Price in, every Way, fitting them for the Purpose; for there is no Proportion between this Expence, and that which must lie upon him to supply his Cattle from other Resources when they are dry.

Two Ways there are of a Pond's losing its Water, and they are equally mischievous, but equally within the Reach of Remedy. The Water may be lost through the Bottom, or evaporated from the Surface, or both may conspire to drain the Pond, and then there is no Hope of its remaining long in a Condition of Service.

Let the Farmer, when he digs a new Pit or Pond, provide against both these Accidents; and when he sees an old one fail, let him examine whether one or the other, or whether both be in the Cause; and apply his Remedy accordingly. Let him observe how those Ponds are conditioned that hold Water best, and imitate by Art what he sees in Nature. When he casts his Eyes about in a dry Summer, he shall see many of the largest Ponds altogether dry, and find in the Field many a small Hole well supplied. Some old Sallow, or other such Tree, grows at the Edge of it, and



and under this the Water keeps quiet, cool, and fresh in the greatest Heats. Let him examine the Bottom in these Places, and he will find it Clay; or if otherwise a Coat of stiff Mud covers the proper Soil, and answers the same Purpose. This shews that a sound Bottom and a covered Surface are the two great Articles for the preserving of Water. Therefore let him, in all new Ponds, clay the Bottom well, unless they be dug in natural Clay; and in all old ones, that lose their Water by its sinking, repair their Bottoms, or coat them altogether fresh. If a good Clay be used for this Purpose, and careful People employed to work it down, the Remedy is absolute, for a Bottom of this Kind will hold as well as one of Lead.

When the Bottom is taken Care of, so that no Water can sink; the next Attention is to be employed on Evaporation. The Sun dries up Ponds very much; and the Winds more. This is less obvious, but equally true. In their Salt Pits in FRANCE, where they evaporate Sea Water for making of Bay Salt, they find one Day's Sun, with a brisk Wind, takes off more of the Water, than three Days of the same bright Sun in a Calm.

The same Precaution that defends the Water from one of these, preserves it from the other; this is the sheltering it at the Edges. Let the Farmer keep in Mind the old Sallow, which he sees over the Pond that retains the Water in its Hollow, while others are dry. This is Nature's Method, and this he should imitate. Let him plant all about his new made or new bottomed Pond, except in one Place, which is to be left free for the Cattle to come down to the Water; or if it be in common to two Fields, which is a very good Practice, let him make two such Openings. Let all the rest be planted with any of the Trees that will thrive in a wet Soil; but of these none is better than the Kind already named, the Sallow, for it grows quick, and its Leaves do not give any ill Taste to the Water. The Boughs of these Trees, as they grow, should be made to stretch and meet from the two Sides, over the deepest Part of the Pond. The Sun will thus be kept off, and the Wind will have no Power. The Water will be kept in, and will be clearer than when it is disturbed by every Blast. As none of it will be lost: there are very few Summers in which Drought will be able to affect it.

If there be any where, in the adjoining Ground, a Spring, that should always be brought in, and a good Conveyance made for the waste Water; the Consequence of this will be, that there will be a Constancy of fresh Water, and yet the Ground will be kept dry. The frequent Rains with us make our People neglect the Care of these Reservoirs of Water too much; but in other Countries they are extremely nice and curious about it, and if we took their Example, many of the disagreeable Consequences of Drought would be prevented. When the Farmer makes a new Pond, or new clays the Bottom of an old one, let him be careful to do the Work perfectly, for if there be the least Defect where the Water can make its Way out, nothing will do but new working over the whole.

For a new Pond, one Coat of Clay, of eight Inches well ram'd, and another of six Inches, covered with rough Stones, is the best Method. For the new bottoming an old Pond, a single Coat of Clay, and the covering of Stones, will answer the Purpose very well and very securely.

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## CHAP. VII.

### *Of obtaining Supplies of Water when the common Ponds are dry.*

AS the common Ponds will easily be exhausted in a Season of Drought; and the better made ones will sometimes fail; it is needful to consider farther what may be done in such Extremity; for a Supply must be had somewhere, or all will be lost. Thirst to Cattle, as well as to Mankind, is more terrible when in the Extream, than Hunger, and is as certainly fatal in the End.

We have mentioned, in the preceding Chapter, the taking Advantage of Springs for the Supply, when they lie near the Surface: when they are not to be found there, they always may be had at greater Depths; and this is the proper Resource, indeed the only one. Wells must be dug in fit Places, when all other Supplies of Water fail. It is often a discouraging Thought, to consider to what Depths it may be needful to dig in this Case for Water, and what Expence may attend it; but, on the other hand, there is the absolute Necessity of the Water, and the Certainty of the Supply: for Water may be had any where, if the Expence of digging be not spar'd. The Construction of the Earth is such, that there every where run Courses of Wet at different Depths, usually near the Surface, and rarely at a great Distance under it; wherever they lie they must be found on these extream Occasions, or all will be lost.

When the Well is deep, and the Supply of Water that is required from it is great, there must be proper Contrivances used for the getting it up. Men may be employed to draw it from small Depths, and in moderate Quantity; where more Labour is required an Ass may be used, or where there is Need, Assistances may be employed drawn from the Principles of Mechanics.

The Wheel in which a Beast walks to raise Water from a deep Well, is a very good Contrivance: a double Wheel, with Coggs, is another excellent Method, because it makes the Draught easier than in the common Way. The double Wheel, with a long Line to the Hand, is also another Improvement, because the Weight rises much easier.

Where there is a large Stock to be watered, the common small Buckets are not to be used, for that would be endless; and in Proportion as larger are required, and the Weight to be drawn up is increased, the more needful it is to be careful of the Force and Assistances in drawing. A very good Way of drawing great Quantities up with Expedition, is to place a large Wheel at the End of the Windlass, four Times at least the Diameter of the Windlass. A thick Rope is to be



be fastened to the Bucket; and a smaller of due Length is to be wound round this great Wheel. The Length is to be such, that when the Bucket is in the Water, the small Rope is all wound upon the great Wheel, and the Bucket being filled, a Servant is to take the End of this small Rope and go forward, till, as that unwinds, the Bucket is drawn to the Top.

Those who are not acquainted with the Powers of Mechanicks, can entertain no Notion of the Effect this has. A single Man will thus be able to draw up a Bucket of twenty or five and twenty Gallons, and that with great Expedition, and little Labour. This is a Thing of vast Consequence, when large Draughts are required.

A good Contrivance, in Case of these large Buckets, is to have them made so that they shall fill without turning sideways, and this is very easy. A large Hole is to be made for this Purpose in the Middle of the Bottom of the Pail, and a Cover is to be fitted to it in the Manner of the Sucker of a Pump; in this Case, as soon as the Bottom of the Pail reaches the Water, the Hole will open and the Bucket will presently fill; then, as soon as it is drawn out of the Water, the Cover stops the Hole and it comes up securely. This prevents the sinking of the Bucket, and a great deal of Trouble.

Any Wheelwright will be able to make such a Wheel, and it will be a very good Method to make it with Teeth, and with a Ledge of Wood so falling upon it, that as the Servant moves forward in the drawing, nothing stops the Pail; but as soon as it is high enough, the Ledge of Wood bearing against the Teeth, stops it. The Structure of a common Jack Wheel will explain this easy Piece of Workmanship.

The Way to be most expeditious in raising Quantities of Water by this Method, is to have a Receiver for a great deal of Water placed ready near the Well, and a Trough long enough to reach from the Ledge of the Well to it. This Trough is to be placed under the Bucket, and it will be easy by fastening a Cord to the Cover of the Hole within the Bucket, to pull it up when the Trough is set under; thus the Bucket will both fill and empty without turning down, which will be a great Ease and Convenience in such a large Size.

This is a Method by which the Farmer will be able to supply his Stock always with Water, in Seasons of Drought, but it is expensive, and takes a great deal of Time to begin and finish it. Therefore as the Cattle might be lost while it was doing, if never thought of till wanted, the Farmer in a large Concern, where he sees there may be a Necessity of such Assistance, should have it ready in Time, and at the Expence of his Landlord; for the Well will serve successive Tenants, and therefore is not to be the Charge of one.

Where such Contrivance is wanting, let the Husbandman look carefully about, and see if there be no Place in the higher Ground where the Water is detained. Ponds on the Tops of Hills are not uncommon, and where there is Water above, it is easily brought down to be of Service. In this Case his Care should be to keep the Pond at the Top well sheltered and well bottomed,

that all that comes to it may be preserved in it, and then Pipes are to be laid from this to the Place where Water will be most needed. One should be always carried to the House, and another to a Place where the Cattle may be conveniently watered. Thus will a Supply be often preserved, when all others, except deep Springs, fail; and in this Way there is nothing of the Trouble of drawing up and emptying, as in the others.

It is frequent that Springs rise on the Tops of Hills: these will fill such Ponds, and afford a lasting Resource: but without these the Assistance of such a Supply is very common. I shall refer the Reader about LONDON to one familiar Instance. On the Right Hand Side of the Road to HARROW, about a Mile from PADDINGTON, is a very considerable Farm occupied by Mr. GODFREY. It is near the Top of the Hill. After a few more Paces you arrive at the Top, which is a Flat of no great Extent, dropping off every Way again: there is a little sinking in this Ground toward the Middle of the Flat, and in that Place is a large round and deep Pit. This is always well supplied with Water; and from this Mr. GODFREY has Pipes laid, which go to his House, and afford a continual Quantity for all needful Uses.

At first Sight a Person might imagine there was a Spring in this Place; but I have examin'd and found it otherwise. The Soil is all a hard firm Clay; by this Means the Pond is as well fenced to keep Water as if it were leaded; and though exposed some Part of the Day to the Sun, its Depth to the Surface shelters it very well from the Wind. It receives the Water no other Way than from the Rains that fall upon the Flat, at the Top of the Hill; but the Soil there being all the Way Clay, it takes almost all that falls on the whole Surface. Very little is absorbed by the thin Coat of Mould, which covers the Clay in that Place, and the rest sinking toward the Pond, is received into little covered Drains, that discharge themselves into it.

Nature has, in many other Cases, given the same Opportunities of supplying a Farm with Water, in Times of Drought: it were well if others had made the same Advantage of them.

This is the most rational and best Method of bringing Water from a higher Place down to the Farm; on the other hand it may often be necessary to bring it up from a lower, when the Cattle cannot of themselves get at it. In this Case Recourse is to be had again to Mechanicks: There are various Ways of getting Water up from below, some suited to larger and others to smaller Purposes: of all others the most convenient to the Farmer will be the PERSIAN Wheel, which we have named before. This is constructed at a moderate Expence, and will last a long Time, being not liable to be often out of Order; and the Quantity it will raise is sufficient for all possible Purposes in the Service of the largest Farm.





## C H A P. VIII.

*Of the Signs and Notices of Drought to be observed by the Farmer.*

**A**S a Continuance of dry Weather in the Heat of Summer is the Source of this terrible Calamity to the Husbandman, he will naturally be terrified with the Apprehension of it, oftener than injured by the Thing itself. It will be natural for him, on any long Series of hot and dry Weather, to fear he shall not have Showers; and as he will be in the right to provide against the Disaster as early as he can, it will be of great Use to him to make a rational Guess, whether the dry Weather that at any Time alarms him is or is not likely to continue.

We smile at many of the common Prognosticks of the Weather; and acknowledge that those which are better founded are uncertain: we could therefore have gladly dropped the entering upon the Subject at all, but that we think it may be of real Service to our Readers; therefore we shall lay down such Observations, as are most likely to inform the Husbandman what he is to expect; cautioning him never to have Recourse to them but in continued dry Seasons, and then to judge of them as we deliver them, not as certain, but in some Degree probable; accepting them as the best Guides he can obtain, and therefore consulting them for Want of such as would be less dubious.

Prognosticks of Weather are seen in animal and in vegetable Bodies; not only such as are living, but in the Parts and Preparations of them when dead.

It is plain from repeated Experience, that Birds, Beasts and Fishes are warned of the Changes in the Air, by Notices that either do not reach us, or that we do not regard.

We see in the Weather Glasses the great Effect of Changes in the Air; and we perceive it also in many other natural Instances.

These all shew that Changes of this Kind affect both solid and fluid Substances; and therefore that we may seek for them, and observe the Marks of them, as Notices of succeeding Changes or Continuance of Weather in almost every Object that is before us. In Things inanimate we can only perceive them by Examination. A Board will swell against Rain; but if we do not observe and examine it we shall not see it: but in living Creatures their Actions shew what they feel; their Bodies are affected by the Changes of the Air, and they are guided by Instinct, more certain than Reason, and more invariable; therefore we may observe their Actions as Prognosticks of what will happen in Consequence of what they feel.

These Creatures are the more sensible of all Changes in the Air, because they live exposed to it, and can feel no Changes but what are natural: Mankind who live in Houses alter the Temperature of the Air by Fires, and are by that Means made incapable to judge of its real Variations. The Change from the Air of a Room with a Fire, to that of a Field or Garden, is so great,

that it quite drowns the small Variations which may have happened in that free Element; rendering them commonly imperceptible, and when they are greatest of all, confused and uncertain.

For these Reasons we must conceive that other Creatures are more sensible of these Changes than we; and as they have Motion and Voice, we are to watch both for the finding out their nicer Feelings.

Slight Changes in the Air are so frequent and so sudden, that nothing can be expected to be thus made out from them: therefore let the Farmer never seek after these Signs of them, but when a settled and continued Season of one Kind has made it natural and necessary for him to look after every Notice of another.

In this Case of Danger of Drought, if there be Herons in the Neighbourhood let him observe their Course. This Bird delights in a lofty Flight, and will indulge itself in it, when Opportunities of satisfying its ravenous Appetite do not call it lower. When the Heron flies high in the Middle of the Day, it is a Sign the Dry Weather will continue. The Food of this rapacious Bird is principally small Animals that haunt about the Waters. Fish are its Delight when it can catch them; but they are too swift in their Motions for its general Supply: Frogs, black Snails, and other such Creatures, are its common Prey. The Dews of the Night call out these early in the Morning, and this is the Heron's Time of preying. When the Earth grows dry, and the Sun hot, they retire into their hiding Places, and the Bird indulges himself in his airy Flights. This is his Custom in dry Weather: but if there be a Change for Rain, these Insects feel it, and they crawl out of their Holes by Day. The Heron feels it also, and Instinct guiding him, he descends in Search of them: his Flights are low, and he is frequently stooping.

Upon this rational Principle depends the Sign of Drought from the Heron's flying high; and it is one of the most certain that are to be gathered from the Bird Kind: but it is not on any one of these the Farmer is to build his Opinion: Things doubtful are no Way so well confirmed, as by being supported one by another.

All Beasts are rendered faint and languid by a Continuance of hot dry Weather; and while they continue so, 'tis a Sign the Cause will continue. The Farmer, to know what he is to expect in this Matter, should watch the Actions of his Stock: while they seem inactive and dull; while they rise late to their Food, and eat it carelessly, it is a Sign the Drought will continue. They feel the first Approaches of Rain; and before the Farmer sees the Clouds toward it in the Sky, he may know it will happen by their Conduct. After a long Series of dry Weather, the Sheep will rise an Hour before their Time to feed. When Rain is coming they and all the other Cattle will feed heartily: their Motions will be brisk, and the Cows and the Oxen will toss up their Heads and snuff the Air with Pleasure.

When the Farmer has these Notices of Rain from the Bird and Beast Kind, he may give up his Fear of Drought; for Showers rarely fail to follow. Many more might be named, but these after a long Drought are certain the most.

To these Signs from the Birds and Beasts we may



may add some from Fish and Insects, but they are not of equal Certainty; they will serve as a Confirmation of the others, though less authentic alone.

If the Farmer has a Pond with Fish, let him from time to time look into it carefully. If his Fish keep out of Sight the Drought is likely to continue: and on the other Hand, if they come up to the Surface after disappearing many Days, he may imagine there will be Rain. Fish love Air, but it must be a moist Air; and they feel it even under Water.

This is another though a less Reason of the Heron's leaving his high Flight when Rain is coming. He has no Chance for Fish while they all keep in the deep Water; but when they rise in the Shallows he may surprize some of them.

Eels keep all Day deep in the Mud in dry Weather; but they will often put up their Heads on the Approach of wet, and sometimes crawl on the Surface. These, more than any other Fish, are the Prey of the Heron; and this is another Cause of his leaving the airy Heights of his dry Weather Flight when the Approach of wet calls them out. Added to Instinct here may be the Assistance of Eyesight. The Sportsmen know from what a Height Hawks will see: the Heron has Eyes of the same piercing Kind; for all Creatures have their Organs suited to their Uses: and the Sight of Fish rising to the Surface, and of Frogs crawling out of their Holes, may bring this Bird down, as well as the Guidance of Instinct upon his Feelings.

In long Droughts Worms penetrate deeper into the Ground. This is natural, for they must have Moisture: their very Skins also dry up when exposed to a parching Air, and it is certain Death to them. In these Continuances of dry Weather they rarely come Abroad: and while the Farmer sees nothing of them or their Casts upon the Earth, he has Reason to fear the Drought will continue.

These are the principal Signs of continued dry Weather from living Creatures; but there yet remain other Observations for the Husbandman on Things inanimate on Earth, and in the Skies: all these he is to observe; and joining them with the others he will seldom be misled in his Opinions.

When all the Wood Work about his House and Yard moves loose and easy, and the more slight or coarse Works rattle in the Joints, it is a Sign the dry Weather will continue; and when the Surface of Marble or smooth Stone in Chimney Pieces and Floors is perfectly dry, it is also of the same Purpose. We speak here of Rooms in which there are no Fires; for they will change the Nature of all these Signs.

With Respect to the Heavens let our Farmer observe the Sun at his Rising; for he is an ill Husbandman that is not up before him: if he rises small and blue, too bright to be looked upon, and in a clear Sky, there is all the Appearance imaginable of a continued dry Time. When there are rainy Vapours in the Air, they enlarge his apparent Bigness, and shew him of a fiery Colour. In great Droughts the Sun constantly rises of the same Size as he is seen all the Day, and of the same intolerable Brightness.

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At Night let the Husbandman watch the Moon and Stars: if they are bright and clear, there is the same Reason as from the Sun's Brightness to believe the dry Weather will continue. If the Horns of the new Moon look particularly sharp, that also is a Sign of its lasting.

All these Observations depend upon the same Principle, the Clearness of the Air through which we see them. To speak to a Philosopher we should only say, a clear Air in dry Weather is a Prognostick of its continuing dry: but to the Farmer we explain the Matter by Instances.

The Clouds may give some Signs of Drought also; though from their fleeting and inconstant Nature, less Dependance is to be placed on them than on the other Tokens. Thus if the Sun set red, that is, if there be a light red Sky in the West at Evening, it is a very strong Sign of the Continuance of dry Weather; especially if the East be free from Clouds at the same Time. In the same Manner, when only a few light loose Clouds are seen in the West at Sun-rise, and they soon disperse, it is a Token of the Continuance of the dry Time.

The last Thing we shall direct the Farmer to observe as a Guide to judge of the Continuance of dry Weather, is the Wind: let him watch this carefully. The North and the East are the fair Weather Winds in ENGLAND; the South and the West those which often bring Rain. When the Wind seems settled in one of the dry Quarters, or in changing goes only toward the other, there is the greatest Probability that his Birds, Beasts, and all his other Observations, have told him true; and that he is to expect a Season of Drought: and in this Case let him prepare for it.

There are lesser Observations to be made for the foreseeing sudden Showers and Days of clear Weather in the common changeable Course of Things: these we shall treat of as lesser Signs under the Article of Rain; but in this Place we are considering a Thing of much more Importance than those sudden Variations.

We have laid down a Number of Observations from different Sources, all tending to the same Point, the long and settled Continuance of dry Weather; the Consequence of which in the Extrem is Drought. When the Farmer sees one of them; let him examine whether the Rest hold good; and if they all do, prepare against the Accident they threaten; let him secure and preserve his Water upon these first Notices, and if they continue any Time, as the present Examples seem to foretell they will, let him begin seasonably to obtain such Recruits as will be absolutely necessary; and in this let no Evasion take him off, nor any Expence deter him. His Neighbours will be in the same Condition with himself, so they cannot supply him; and it is very probable that the Consequence may be the loss of great Part of his Stock.

C H A P.





## C H A P. IX.

*Of Rains.*

WE are here talking of the Extrems of those Things, which are in themselves, when properly moderated, of the utmost Advantage and Use: Heat was the last named, and Moisture is to be treated of in this Place. Both are needful to the Growth and thriving of Plants; and they are indeed the two great Requisites to that Purpose: but both may be destructive, both to the Crop and Stock of the Farmer. 'Tis a Proverb, that the best Things when improperly conducted may be the worst; and it is in nothing so true or so evident as in these Articles. We are not to arraign the Wisdom of Heaven, which doubtless when it suffers these Evils to fall upon the Husbandman, by that very Sufferance prevents greater: but in the plain Face of Things, Heat in Excess is fatal, because it brings on Drought; and Rain in Excess is destructive, because its Consequence is Inundation.

'Tis not impossible, that by the vast Rains of this late past Winter we may have escaped the Earthquake that overthrew LISBON, and shook as it should seem a third Part of the Globe. This Consideration may stop our Mouths from exclaiming against that Providence, which in Mercy to us has been thus seemingly cruel: but it is not to with-hold our Hands from relieving us from the Consequences of this great Fall of Waters. They are not the less hurtful to the Farmer, because they may have served so great a Purpose in the Order of Nature; therefore he is to consider the Remedies for their Consequences.

All Lands will receive Damage by violent and excessive Rains; but those most which lie lowest. From the higher Grounds they wash away the Manure that may have been laid on, and even their finest Mould; this therefore must be replenished: but from the lower Grounds it is necessary to remove them, or they become Ponds or Bogs, not Meadows, Fields or Pastures.

This is an Accident the Farmer should always foresee and provide against. It is more frequent by far than Drought; and with Neglect every Year may bring it upon him.

Every Piece of Ground has some Declivity or Descent: his Business is to find that; to cut Channels in Readiness for the Reception of the abundant Water that shall fall upon the Ground, and to lead them according to that Descent to discharge themselves at the lowest Place.

We have shewn in the Words of an ingenious and worthy Correspondent, how accidental Floods may serve the Purposes of the Farmer in shewing him the true Descent of his Ground: these he is always to observe, for nothing will so well inform him how to carry his Drains. This Subject having occasionally treated on before, we shall not repeat any Thing here.

Beside the Damage that may arise to the Husbandman by the heavy and continued Rains of Winter, there are Seasons at which every Shower may reasonably alarm him. These are particu-

larly the Times of Hay making and Harvest. He is for the Success of these Operations to seize upon every good Hour that comes; and it will be of the utmost Importance to him on this Account, to form some reasonable Conjecture what Weather is likely to follow.

It is a Matter of Indifference whether he bring the Scythe into his Meadow, or the Sickle into his Field, one Day or another. There is a Time at which the Grass has most Substance, and the Grain is richest in the Ear; but this is not limited to a Day in these, as in some other of those precarious Crops we have named.

The Farmer may be tempted by fine Weather to begin both somewhat sooner than he intended; and he may, on the threatening Prefages of Rain, defer them some Days. It is therefore of the utmost Importance for him not to deceive himself concerning this Article: and as it may with some tolerable Degree of Certainty be foreseen by many Means, we shall give here all that have Reason for their Foundation, among those Things that are generally supposed to forebode Rain.

We shall here, as in the foregoing Chapter, select those Signs for which there is Foundation in the Laws of Nature, and which we have known Experience to confirm; passing lightly over the others, and utterly rejecting the Fancies of weak and credulous People, which have too long imposed upon the Injudicious.



## C H A P. X.

*Of the Signs and Notices of Rain to be observed by the Farmer.*

IN general the opposites to all those Things we have set down as Signs of Drought are to be understood as Notices of Rain: therefore the Farmer recurring to our last Chapter on Drought, will there see the many Things that strongly preface Rain, as the contrary of those there named. Thus when the Heron flies low; when the Cattle rise early to their Eating; when Fish swim on the Surface of the Water, and Worms crawl frequently out of the Ground; when Wood swells, and Marble is wet on the Surface; when the Sun looks big at his rising, and the Moon and the Stars appear dull; when loose Clouds fleet about in the West in a Morning, and do not disperse as the Sun advances against them; and when the Wind is South or West, and changes only from one to the other of those Quarters, Rain is to be expected.

These are the Opposites to those Signs we have given of continued Drought: therefore having explained their Causes severally there, we need only recapitulate them here to the understanding Reader.

To these we shall add many more Accidents in Nature, which may be understood as general Prefages of Rain; and which often precede the lightest Showers.

Birds feel the Approach of Rain as other Changes in the Air, and this always with Pleasure: a moist Air seems best suited to the Nature of all the Kinds that are wild with us; and particularly to the Water-Fowl. It also brings out of their



their Lurking-holes the Myriads of Insects which are their Food. The Farmer should watch the Fowls of his Yard, and the wild Commoners of Nature, at all those Times when he fears Rain.

If his Geese and Ducks prune themselves, seem more than ordinary chearful and lively; and the Crows in their hoarse Voice caw from the Tops of the Trees, he is to understand it as their rejoicing at a damp Air, and the Approach of Rain: these last named Birds are extremely sagacious. When they fly about tossing up their Beaks, and are very noisy, the Rain is coming: and when they stalk by the Sides of Brooks and Ditches, it is near at hand.

When Swallows fly low it is a very well known Signal of Rain, and is founded on the plainest Reason. The Food of these Birds is little flying Insects, and all these unable to bear up against the Weight of the Air when loaded with Damp, fly low. The Eye sees this, and Reason confirms it.

The Crying of Peacocks is another known Sign of Rain: it is that Bird's Note of Joy. His Voice is hoarser than the Crows; but it is, like the cawing of that Bird, a Sign of his Satisfaction.

Among the Beast Kind Sheep shew the first Signs of perceiving the Approach of Rain; it makes them sprightly: they leap about and play with one another. The Afs foretels it by his braying, which is also his Note of Satisfaction; and the Cows and Oxen by tossing up their Heads and licking their Snouts.

These are the Signs of Rain being gathering in the Air; but when it is just at hand Cattle give other kind of Notice. They flock together to the Hedges, and seek Shelter under Trees where they may stand till the Shower is over, and whence they may proceed to the Grass sweetened by this Sauce from Heaven.

The very Insects may be of Use in this Way to the Farmer; their tender Bodies give them Notice of the Changes in the Air long before Men perceive it. The Bees keep within their Hives, and the Ants leave their busy Motions, and retire deeper into the Ground. They carry with them those Cases in which the winged Sex are lying for their Change, as the winged Insects of all Kinds do. These common People call their Eggs; but that is an Error.

From the Animal Kind we shall lead our Farmer for Presages of Wet to the wild Weeds of the Field, and to the common Products of his Garden. The Poet speaks of the closing of the Flowers of common Marygold at Evening: he calls it

*The Marygold that goes to Bed with the Sun,*  
and this, and all the other Flowers which have that Quality, as there are very many that have, shut up in the same Manner more or less when Rain is coming.

The youngest Flowers, or those most newly opened, have this Quality the most sensibly; and they are to be watched for it: dry Weather opens them fully; and as wet is nearer or farther off, or as there is more or less of it in the Air, they firm or draw together their Leaves in a more close or loose Manner.

In the Corn Fields the Farmer will meet with a little Plant famous for many Virtues, its Name

is Pimpernell, he will know it by its small bright red Flowers: these open in dry Weather, and shut up against Rain. Wet may be foreknown a whole Day before it falls by this Flower; and the Country People in some Places are so sensible of it, they call the Herb their Weather Glass.

In the Pastures he will see many Heads of Dandelion gone to Seed: these are so many Globes of Down in fair Weather; but against Rain they contract themselves, and shew a very plain Mark of its coming.

From his Pasture let the Farmer look into his Clover Field, and he will find another Mark of Rain which has been observed these two thousand Years: the Clover when Rain is coming stands more upright and firm than at other Times; the Stalk is swelled and stiffer. This is true in the same Manner with many other Plants, but in none so distinctly.

From the Field if we bring him into his House, he will there find also the Signs of approaching Wet very frequent and very familiar. All Wood swells with the Wet; and the softer Kinds the most. Deal, which is the Timber of the Fir-Tree, and is one of the softest of them all, swells most of all; and its common Use in Houses gives Opportunities of seeing it: Doors will not shut; for both the Posts and the Boards of which the Door is made swell: Window-Shutters stick, and Boxes are hard to shut or open: Drawers of the same Wood also stick in their Cases; and those of other Wood do the like in Proportion to the Kind.

From these Things of common and small Concern, let him turn his Eyes up to the Heavens. We have observed, that the Sun's looking red and large is a Sign of Wet; and let him mind the Clouds that accompany this Appearance, for they will not only confirm that Rain is falling, but in some Measure shew the Time when it will come.

If Clouds presently after such a Rising of the Sun gather in the Sky, and the Air appears thick and watery, then it will presently rain; and the hotter the Weather, the sooner the Rain is to be expected from his Appearance.

When at Sun Rise, or soon after, there be a Circle or Part of a Circle of a blueish or whitish Colour about the Sun, there may be expected Rain some time within the Day.

We have before observed, that a red Sun at rising is a Sign of Rain; and the same is to be added concerning its looking dull and white. The natural Colour of the Rising Sun in a clear Air is the same that it has at Noon Day, a deep fiery Blue, which the Eye cannot look upon a Moment. When he is dim and faint, and looks white, it is owing to watery Vapours in the Air; and Wet is near.

If the Moon have a large Circle of a whitish Colour round her at a Distance, it is another Sign of Rain: and when the Stars look larger than usual, and fainter, and twinkle less, it also presages Wet the next Day: this Observation of the Stars not twinkling so much, the Farmer is to understand is confined to the fixed Stars; for the Planets, though larger than they, never twinkle at all.

The Clouds give also many Prognostications of Wet. When there are many small ones scattered



tered about the West in an Evening, Rain is to be expected the following Day.

It is usual at these Times to see the Clouds large, thick, and massy, so that a fanciful Person may imagine among them Resemblances of Rocks and Towers. These are Signs of a great deal of Rain, and often of Thunder.

The Rainbow is a Source of many Prognostications respecting the Weather; and is not sufficiently understood. In general it bespeaks a Change: if it appear after a great deal of dry Weather, it foretels a great deal of Rain; but when we see one after a great deal of Wet, we may expect fair Weather.

A bright Rainbow in the East is usually followed by a great deal of Rain.

Mists from Waters afford also a regular and very certain Prognostick of succeeding Season. When they are thick in the Morning, and presently after disperse, they are Tokens of fair Weather: but when they rise to the Neighbouring Hills, and hang in the Air, they usually presage Rain, though commonly at a Day or two Distance.

These are the principal Notices from the various Works of Nature, which the Farmer is to observe as threatening Rain, during his Summer Works; and as it will be of the greatest Consequence in Respect of these to know from all Methods when he is to expect proper Weather, as well as when he is to fear such as will be hurtful: we shall add those several Appearances from all Kinds of Objects, in Consequence of which he may reasonably promise himself a fair Season, for the cutting, drying, and carrying in his several Products.



## C H A P. XI.

### *Of the several Signs of fair Weather.*

**W**E have before spoke of those continued dry Seasons in hot Summers, which bring on Drought and are in the highest Degree detrimental to the Farmer; but what we are here to speak of is, that Kind of fair Weather which comes in seasonably, and lasts properly and in a natural and useful Manner: such clear Seasons as come between the showery Times, and serve for the gathering in the Produce, without Wet.

The several Signs by which he may probably know such Seasons are approaching are these. A clear Sky in a Morning, and a bright Sun-rising in it, are the natural Tokens of a good Day; and when at Evening he sets in a light and bright red Sky, and without heavy Clouds, there is Reason to entertain good Hope of the next.

Next to the Sun the Moon is to be observed. At all Times when she looks bright and clear, and has no foggy Circles round her it is well; but the greatest Promise is from her Appearance a few Days old. Let the Farmer, whose Harvest Time approaches, watch well the new Moon. If he see her Horns sharp, clear, and fine, he may reasonably expect fair Weather till her Full; and probably enough it will continue much longer.

The Stars give the same Token of fair Weather as the Moon, and just in the same Manner. When they look very sharp and bright, and twinkle strongly, there is a clear Air, and it is like to continue.

White, small, and scattered Clouds at the North East, are also a Token of several Days fair Weather.

On Earth the Farmer will find Means of Information in this important Article, as well as in the Heavens. Let him look to the Hills, and if he sees their Tops clear he may expect bright and serene Days: even the Stone and Brickwork of Buildings, in some Degree, gives the same Notice to the Eye. It is seen more clear and distinct in the pure Air, that brings in fair Weather, than in such as is full of watery Vapours, and precedes and presages Rain.

Light Mists, of a white Colour, gathering early in the Morning over Waters, and soon dispersing, are Signs of fair Days.

If a Shower happen, and there be a Rainbow, let the Farmer watch it carefully; if the blue be a strong Colour, and the yellow be bright, it is a Sign of clear Weather quickly following.

When Gnats swarm in an Evening, and the Glow-worm crawls Abroad at Night, good Weather generally follow. These tender Insects dread the Rain as fatal to them; and hide themselves when Instinct gives them Notice of its coming. Their swarming Abroad therefore is to be observed as an Information of fair Days succeeding, given to Mankind by their Actions. Instinct guides them; and Man's Reason is to be directed by it.

The Bee is also a sure Director. Her little Organs feel the Approach of Wet; and keep her Prisoner in her Hive, or limit her to short Excursions when it is near: therefore when she flies far, and returns late, good Days are coming.

Next let our Husbandman observe the Birds. When the Kite and the Swallow fly high good Weather is coming. They can see their Prey to a greater Distance in that clear Air that presages fair Time; and they love lofty Flights.

When the Sea Birds leave the Shore; and when the Owl hoots softly, gently, and composedly, fine Days may be expected.

Fish and Insects join also in giving these Tokens. When the Roach and Dace leap up out of the Water, and when the Spider hangs its light Webs in the Air, fair Weather is coming: Experience, more than any certain Reason, establishes this Token from the Fish. As to the Insect it is plainly the Direction of Instinct. Its tender and exposed Body feels the Change of Air for dry Weather; and Instinct directs it on that Notice, to venture out its Threads, because there will be nothing to hurt them.

Lastly, we shall give the Husbandman a Notice which he is to regard more than any of the preceding, because it answers doubly, as a Promise of fair Weather for the present, and a Denunciation of Rain soon after. This is that thick dark Sky we sometimes see for a Continuance of Time, without either Sunshine or Rain. This is a Thing that frequently happens in ENGLAND about the Harvest: and the greatest Regard should be had to it: it is an unerring



erring Rule, that such a Sky is followed by some fair Weather, and that Rains come soon after. Therefore let the Farmer manage his Business accordingly.

He needs not be afraid of sudden Rain, where there is such a Sky. He may proceed in his Employment, assuring himself that though Rain will follow, there will be an Interval of fair between, which will serve at the same Time to finish his Work, and to give him Notice of Wet to follow, from which he is to guard his Crops.

## CHAP. XII.

### *Of Hail.*

**H**AIL is an Accident much more dangerous to the Gardener for his forward tender Crops, than to the Husbandman, whose Products being at all Times exposed to the Weather, are more hardened: when it happens to be very violent, and the Stones very large, it will do him some Damage; but it is less to be foreseen, and less to be guarded against than any of the other Accidents of Weather. In the warmer Parts of EUROPE it is often terrible to the Husbandman, because the Heat brings his Crops as early forward in the Field as ours in a Garden: but neither there can he foresee or guard against it.

Those Storms in those Countries are less frequent than in ours, but sharper. The Roman Catholick Religion established in most of those Kingdoms, throws them into the Mockery of Processions, and solemn Rites; and as these Storms never are very lasting, they attribute the ceasing of them to those Solemnities. God, who commissions all these Things for Purposes unknown to Man, though intended for his Benefit, is not to be averted from his settled Intent by their ignorant Prayers. The Pagans who beat Drums when the Sun was eclipsed, were about as wise, and had as much Share in the bringing Light again. Submission under Afflictions, and general Prayers, are the Dictates of Reason in these Cases: the Language of the prudent Heart should be, "Thou knowest what is best." And the Christian Resignation is, "Thy Will be done."

All the Husbandman can do in these Storms of Hail is, to watch whether they seem to be slight and common; for in these, as we have said, there is very little Harm to him; or whether they threaten to be very terrible: in the former Case he is to leave all to Nature; and in the latter he should be quick in driving under Shelter, all such Parts of his Stock as could be hurt by it; his Lambs and other young Creatures. His Crop he can no more shelter than he can remove it, therefore it must take its Chance; but as we have observed the common Season of Hail is at a Time when that is not of a Growth to suffer any great Damage.

As we have, on all other Occasions, endeavoured to make the Farmer acquainted, in some Degree, with those several Things wherewith he has any Concern, we shall add here a succinct Account of the Nature of this Substance,

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He is acquainted with the Nature of Rain, which is Water raised in Form of Vapour by the Sun, and falling again in Drops. These Drops often pass through a considerable Depth of Air, before they reach the Ground; and it sometimes happens that they are frozen by the Way. Every one knows what a frozen Drop of Water must be: it can be no other than a small roundish Piece of Ice; and whoever will examine Hail-Stones will find them such. Observations have been made, in particular Cases, of Hail-Stones of odd Shapes, as long, or flat and thin, and Star-like, but all these are uncommon. With Respect to the long and flat, they seem only the Effect of various Degrees of freezing; but the Star-like Hail, which is observed to have six regular Rays, is of another Origin. Those who have examined these Matters nicely, will find no Difficulty in the accounting for that Shape: it is the natural Form of pure Flakes of Snow. Therefore, as the common Hail consists of Drops of Rain frozen in their Passage through the Air, this is composed of Flakes of Snow, frozen to the Hardness of Ice, in the same Manner. What the more confirms this is, that these starry Flakes of Hail are always thin and light.

Though these fall with less Force and Weight than the others, they are often attended with more Damage, especially to the Gardener, for when they are driven before a violent Wind, their sharp Edges cut off the Blossoms of Fruit Trees like so many Knives.

A very good Practice in Gardens on this Occasion is, to stick in Pieces of Furze Bush among the Branches of the Fruit Trees, to keep off the Hail from the Blossoms. We name this here, because it may be transferred, if there be Occasion, to the Field, if the Farmer have any young Crop for which he is in Fear from Hail Storms; he may with little Labour or Expence stick up large Furze Bushes among it at certain Distances, which rising above the proper Growth will, by their bushy Heads, defend it from the Fury of these Storms in the same Manner as in the other Instance.

This is a Caution never needful, except upon particular Occasions, and they are not to be foreseen. Indeed this is the Misfortune with Respect to all the Damage by Hail, but when there is Notice, as there commonly is, of any very violent Storm, it is worth the Trouble of a little Care. The driving in of Cattle and Poultry is the Principal; and 'tis better this should be done when there was no real Necessity twenty Times, than once omitted when there was.

Mischievous Storms of Hail generally are of small Extent, and may be foreseen a little before their coming, by a thick black heavy Cloud, with Chillness in the Air and Wind.

Toward the End of APRIL, in 1697. there was one of these terrible Storms in CHESHIRE. A black Cloud of this Kind foretold its coming about a Quarter of an Hour. This was Time enough to have got in the tender Cattle, but the Farmers were not aware of the Danger, and they suffered terribly. The Breadth of this heavy Cloud was about two Miles, and the Course it took before it dissipated was sixty Miles; along all this Tract there was made the most terrible



Havock of every Kind, but not the least beyond or beside it. The Hail Stones in this Storm were as big as Hens Eggs, Geese Eggs, and some of the full Bigness of a Man's Fist. They were Pieces of clear, transparent, and very hard Ice, with a white Kernel in the Middle, that seem'd a little Lump of Snow. Some of these vast Hail Stones were quite smooth, and others rough and sharp on the Surface. They fell with a prodigious Force, and killed Fowls, Lambs, and Calves: beat down the young Crops of every Kind; and in some Places, where the Wind drove them slanting, plow'd up the very Surface of the Ground, and buried themselves an Inch or two in Depth; Trees were broke and shatter'd to Pieces in many Places; Houses damaged, and many People that were Abroad much hurt.

The Circumstances of this Storm are recorded in the Philosophical Transactions, and in many other authentick Writings: this, and other Instances, are not recited here for Curiosity or an idle Amusement: they are to stand as so many Lessons to the Farmer: Examples of the Losses others have sustained by Neglect of driving in their young Cattle; and Cautions to himself for a wiser Conduct. He sees what Appearances in the Sky foretel these terrible Storms, let him be upon his Guard accordingly, watching when they come, and omitting no Care that may prevent the Damage.

There is recorded in the same authentick Papers, another Hail Storm the same Year much more terrible than the former. It happened in HEREFORDSHIRE, in the Beginning of MAY. Thunder and Lightning preceded it, and for sometime continued with it, as also a violent Tempest of Wind, that blew both the Lightning and Hail upon some Houses, to their Destruction. Nothing could exceed this but the Hail sent by the Almighty upon the Egyptians; nor can any Words, according to all the Accounts left concerning it, so strongly or so truly describe its Terror, as those used on the Occasion in Scripture, "Fire mingled with the Hail ran along upon the Ground."

In this terrible Storm not only Fowls and young Animals of all Kinds were killed, but some of larger Growth; and some labouring Persons in the Fields, who could not reach Shelter, suffered the same Fate, their Bodies being black and blue, as if beat to Death with Clubs. Oaks were split: the Branches of many other Trees beat and torn down; and Fields of Rye were, in some Places, cut down as if mowed off with a Scythe. The Hail Stones in this terrible Storm were of no regular Figure: many of them measured fourteen Inches round\*, and they seem'd Fragments of thick Ice.

The Fields of Rye that suffered thus stood exposed: others in sheltered Places were damaged, but not nearly so much; this may serve as a Caution to the Farmer, and shew the manifold Benefits of Enclosures.

To these Accounts of Hail Storms in our own Country, we shall add two extremely singular in their Kind, vouch'd upon the most warrantable Authorities, the one of these was in FLANDERS, about LISLE, in the Year 1686. and the

other in FRANCE, so long before as in 1510.

In all Observations of Hail Storms with us, they have been no other than Pieces of Ice; but in these there has been something more. The utmost ours have ever been known to contain, has been a little Lump of Snow; but the others have had sulphurous Matter either in their Center, or in their whole Substance. That at LISLE is recorded in the Philosophical Transactions†, and had this Singularity, that the Stones were not only vastly large, but appeared dusky in the Center; and such of them as came down Chimneys into Fires, when the Icy Part was melted, and this brown Substance was exposed to the Fire, burst with a loud Report. MEZERAY, in his History of FRANCE, mentions the other with all its Particulars. In this a black Cloud, such as we have described, came over the Face of the Heavens, and darkened the Air like Night: in the midst of People's Terror and Astonishment; the most violent Lightnings and Thunder burst from it, and Hail began to fall. This encreas'd in a most dreadful Manner, and with a strong and suffocating Smell, like burning Brimstone. The Hail Stones this creditable Author attests, were more like Pebbles: their Colour blueish, and their Hardness like Flint, till they softened in the Wet. He gives an Account of their Size, which exceeds all others, and which, if less authenticated, could not be believed: he says some of them weigh'd a Hundred Pounds. We are not to wonder at the Damage done by such a Storm. He says it killed almost all the Cattle, Fowls and Fish in the County; and vast Numbers of the People‡.

In Calamities like these there can be no Remedy, and there is no Course to follow but Religious Submission. They happen very rarely; and the Damage done by such as are more frequent, is not great.

We have shewn the Husbandman what is in his Power to do against it; and in general, where he has a tender Crop, that stands much exposed, we shall advise him to use the easy Method of sticking up a few Furze Bushes. This will not only be a Defence against Hail, but it will break the Force and Fury of sharp Winds, and keep off those cold Rains, they often carry before them. In all Respects it is a Practice so cheap, so easy, and so certain of doing some good, that we cannot but greatly recommend it.

† Numb.  
203.

‡ Mezeray's Hist.  
de France,  
vol. II.  
P. 339.

\* Philos.  
Transact.  
No. 229.

## CHAP. XIII.

### Of Snow.

WE have in the last Chapter considered an Accident that never can be of any thing except Hurt to the Farmer; though according to its Nature and Degree, that Hurt be sometimes greater sometimes less; we are now to treat of an incidental Thing of the same general Nature, which yet always may be, and often is of great Advantage. A deep Snow keeps all sheltered underneath it; and frequently defends a tender Crop from those succeeding Frosts which would otherwise have destroyed it.

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We have recommended to the Farmer, on some Occasions, the Gardener's Practice of covering his tender Growths in Winter by Haulm, or the dry Stalks of Pease, or the like: the Snow often falls so favourably as to perform this needful Service much better for him than he could have done it for himself; more generally and more universally.

It lies thick upon the young Plants, covering them very perfectly, and defending them from the nipping and destructive Winds; it all that Time mellows the Soil; and when warmer Weather comes to melt it in, nothing sinks down so gently or so gradually. No Water is purer than that of melted Snow, and there is no Method by which Wet gets so thoroughly into the Ground.

Nature seems to have considered greatly the Products of the Earth, in this Formation of Snow. It never can fall but in cold Seasons; which are the Time in which Plants want Shelter: if the Temperature of the Air about the Surface of the Earth be warm, so that there is no Need for it as a Shelter, it dissolves as it falls, and makes the finest watering imaginable.

Snow is in its Nature like Ice, a watery Substance congealed by freezing. When the Air is warmer where it passes, it melts and falls in small Rain.

The usual Shape of the Flakes of Snow, we have mentioned in speaking of the particular Kind of Hail which is stellated, or composed of Rays like a Star. Its most perfect Appearance is in Form of a Star of six Rays, and its Substance clear transparent Ice: but this is not its constant or certain Figure, the Flakes are frequently imperfect, and often less regularly frozen; and all this depends upon the slightest Accidents; the Height from which it falls, and the Degree of Cold in the Air.

Often there are little Points upon the larger Rays; and not unfrequently the Flakes are altogether shapeless and confused, the Snow having melted in the Air, and froze again.

There have been Instances of coloured Snow falling in certain Places, and it has been considered as foreboding some terrible Calamity. There is Account of a red or bloody Snow by an ITALIAN Signior SARATTI, preserved in authentick Writings: it is said to have fallen near GENOA: but this is very difficult to be reconciled to what we know of the Course of Nature. We are sensible that Snow is no other than watery Matter, frozen in a particular Manner; and we know also that this Water is raised in Vapour by the Sun's Heat: now we are sensible from what we see in Distillations, and by various Experiments, that Vapours do not rise coloured. The strongest Tincture of Cochineal will yield a colourless Water, if distilled; and Red Port Wine yields a colourless Spirit. From these, and many other Considerations, there is Reason to imagine that there has been some Mistake in what is written on these Subjects. We know that what have been called Showers of Blood, have been no more than common Rains falling in Places where there have been Multitudes of little red Insects; and that what are called Showers of Frogs, have only been Rain, and have invited those Creatures from

their hiding Places. In the same Manner it is probable that this Snow was not red as it fell, but that it fell upon some red minute Insects. Signior SARATTI says, that when squeezed it yielded a red Liquor, but this may be accounted for the same Way, for if the Insects upon which it fell were squeezed among it, their Juices might turn the watery Part of the natural Snow red.

This may serve as an Account of the Nature of Snow, sufficient for the Husbandman's Purposes of Use, or even for his limited Curiosity.

We have observed that it is often advantageous to him, preserving his Crop; but like all other the good Gifts of Nature, it may be hurtful in the Extremes. The same Rain that moistens the Earth, may drown its Products; the same Heat that calls forth the Shoots of Plants may, in a greater Degree, parch and destroy them; and in like Manner Snow, which shelters his Crop may, in a great Fall, smother his Cattle.

He is therefore to act in this Respect, just as in Regard of Hail. He must watch it as it comes, and observe whether it will be in the common Course, or Excessive and Violent. In common Falls of Snow he has nothing to do: but when he sees a vast Quantity on the Ground, and more in the Air, let him drive in his Cattle, and preserve them from the Danger of being overwhelmed and buried in it, as they often are in those Hollows to which they fly for Shelter.



#### C H A P. XIV.

##### *Of Winds.*

WE have conducted the Husbandman thro' the several accidental Attacks to which he may be subject from Drought and Rain, Hail and Snow. And we are now to consider another Subject relating to the Elements, from which he may, without due Precaution, receive great Harm.

Winds are not of the Nature of Snow, a Benefit in the common Course to the Land: they are too frequently hurtful. Their general and great Purpose is to thin, cleanse, and purify the Air; and as in this Office, so needful to Life, they will often be dangerous to the Husbandman's Crops of various Kinds, and even to his Buildings, he must timely guard against them. Let him not accuse Providence of those Damages he may suffer through his own Neglect: God saw Winds necessary to keep the Air in due Condition, and he has given Man the Use of Reason to protect himself and what belongs to him from their Fury.

The Sea would putrify notwithstanding all its Salt, if the Winds did not stir and move it about: fresh Waters, when they are large, would sooner suffer the same Fate, and Men would be carried off by Pestilences raised from the Vapours of such corrupted Masses: all this is prevented by the timely Ministry of the Winds; and all their Force may be broken with Respect to the Farmer, by a proper Plantation of Trees. We know from what Quarters the most furious Winds blow, and the Defence is to be prepared thickest



thickest there. The Husbandman is not to leave this Care till the Storm comes, but to prepare in Time, as one who expects it. Trees are of slow Growth, but when planted properly they are a very certain Defence.

Beside this general Care there may be particular Cautions used, to prevent Damage on extraordinary Occasions; and as Storms may generally be foreseen, like other Changes in the Elements, these should be prepared according to the Necessity. We shall give the Husbandman a general Idea of the Nature of Winds, and of his proper Defence against them; and afterwards add those Signs by which particular Storms may be known to be approaching, and the best Care of the Products of the Ground against them.

Wind is no other than Air in Motion.

We are sensible there is such a Thing as Air, by the Changes we perceive in it, but as it is too fine a Substance to be the Object of our Sight or Touch, we only perceive it in the Winds, feeling it by its Motion; whereas, when still it is not perceptible to any of our Senses, though manifest to our Reason.

We in this Island are subject to great Variations and Changes of Wind, from its different Direction and Degree of Strength; but this is not the Case throughout the whole World. Between the two Tropicks there is a constant and unchangeable Wind, that all the Year blows from East to West. This Sailors well understand, and it is called the general Trade Wind.

About the Coasts of the Ocean there are constant and regular Winds also, at certain Times of the Day. These are called Sea Breezes. They blow regularly every Evening from the Sea to the Land; and every Morning from the Land to the Sea.

In many Parts of the World there are also regular periodical Winds. These blow one half of the Year one Way, and the other half of the Year the other, without any Variation.

In our Islands the Winds play about with great Uncertainty; but in general, where there is nothing in particular to disturb them, North Winds are most frequent in a Morning, West at Noon, and South at Night.

The Winds blowing from off the Sea are naturally moist, because they take with them a great Quantity of those Vapours which the Sun constantly exhales from the Surface of that vast Body of Water. These Winds, when they are gentle, bring only a fine pure watery Vapour; but when the Surface of the Ocean is ruffled by them in Storms, they frequently carry off a Part of the absolute Salt Water in small Particles. This, when it is carried on Land, is called the Spray of the Sea. It is often very destructive, and it will be carried many Miles.

This is mentioned as a practical Caution for the Farmer. Many of his Crops will be injured greatly by this Accident, therefore it is his Business to plant by Way of Defence; and keep a good Hedge every Way to the Seaward.

The North Winds in ENGLAND are cold, and the Southerly Winds warm. A Fall of Snow will have Power to change the Course and Current of our Winds. A warm Southerly Wind shall often be changed into a cold Northerly one by this or by

a Shower of Hail. It would be natural to suppose the Wind changed, and brought the Hail or Snow with it; but Philosophers, who have examined deeply into those Matters, and particularly that great Christian Philosopher Dr. DERHAM, shews it to be otherwise, and that the Snow or Hail absolutely change the Course of the Wind.

The strongest and coldest Winds with us coming from the North and North East Quarters, it is against these the greatest Caution is to be had in planting.

We have given a large Account of the Nature of Trees, and the Manner of planting them, in a preceding Part of this Work, and to that we refer the Reader for his Choice of the various Kinds. The Sycamore has been happily experienced in the Neighbourhood of the Sea, where it thrives very well; and on exposed Situations the Yew is excellent. It will bear the Exposure, and delights in the hard dry Soil usually found in those Places. And though its Growth be slow, its Strength makes Amends. Its Branches also spread excellently for Defence, and are covered with their Leaves all Winter, the Time when Shelter is most wanted, and when Trees in general are least capable of giving it.

After the Yew we may very well name the Elm for this Service; it roots firmly, and is full of Branches. Its Growth is not slow, and it is nearly universal, for there are few Soils on which it will not thrive.

Hedges are the same Security to Fields that Trees are to the Farmer's Dwelling; and the more he stands exposed to Winds the more he is to guard against them, by a due Care in this Article.

In Trees planted for this Purpose of Shelter to a House, there should be a particular Method of cutting. The Elm will grow to any Form the Planter pleases, and indeed so will most other Kinds. In this particular Service, their Use, and the Intent of the Plantation, should be considered, as also their own Danger. When the Building is much exposed to Winds, so must the Trees be that are set to shelter it: therefore let them be so cut as to be least liable to Danger. The Head is the Part over which the Wind has most Power, and it is of least Service in sheltering the Dwelling: therefore in these Cases let the Head be small, and the Tree encouraged to shoot out into Branches. The thicker they stand the more is the Shelter, and the less they are in Danger of being torn down.

When the Husbandman has taken Care his Dwelling be thus well defended, let him consider what Part of his Crops will be most exposed to Danger from this Cause, and at what Times; and then consider of the Ways to foresee and prevent the Mischief.



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### CHAP. XV.

*Of the Signs by which Winds may be fore-known.*

**T**HERE are fewer Prefages and Notices of Wind, than of Rain or Drought; and they are to be obtained from fewer Objects: but therefore the Husbandman, who wishes to preserve his Crops from all Accidents, should be the more careful in looking after these.

If there be a red dusky Sky in the Morning, and the Sun rises in it white and deadish, the Farmer may expect that Day violent Gusts of Wind; and generally there will be some Rain with them.

When the Sun is pale at Setting, and goes down behind a thick dead-looking Cloud, there commonly follows Rain that Night; and in that Case there is usually a strong and disorderly Wind the next Day.

If the Moon look dim and misty, and have a large hazy white Circle about her, the next Day will be generally much ruffled by Winds.

When the Moon looks particularly bright, but has about her two or three broken Circles, it is a very strong Sign of a Storm.

When the Stars appear more numerous in the Heavens than usual, and have a particularly lively Lustre, it foretells a Storm. This as well as the last Observation regards violent Winds, more than those light Blasts of short Continuance which are often prefaged by the others.

At any Time when there are a Number of small black Clouds scattered in the Heavens, and they move to and fro in a disorderly Manner, strong and unsettled Gusts of Wind may be expected: these are the Winds that do most Harm of all to many of the Products of Husbandry, and therefore the greatest Regard should be had to this Signal, which gives Notice of their coming, and every Precaution taken in Time against them.

When there is a Rainbow, let the Farmer look carefully upon it; not only with Respect to those Signs of Rain which we have directed him to understand from it, but on this other Occasion of Wind also.

When the Rainbow is thicker than ordinary, it is a Sign of Gusts and Blasts. When there is a great deal of Red in it, and that is very fiery, it betokens violent Storms.

The Rainbow is naturally a continued Thing; but sometimes we see it interrupted in its Course, broken, and as it were separated into many Parts: this is always a Signal of Winds. Most of these Signs that are perceived in the Rainbow, foreshew Winds attended with Rain; but that is not constant and certain.

Among Animals fewer Notices of Winds are perceived, than of other Changes in the Elements; yet we are not wholly without Notices from them. About the Sea Coasts in particular, a great deal may be gathered by those Birds which live partly on the Water and partly at Land. The more serene the Air, the farther they keep out at Sea. When they suddenly

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make to the Shore together, there is certainly a hasty and violent Storm approaching: and when they keep about the Shore, and will not venture into open Sea, there will certainly be strong Winds that Day.

There is in some Places a small Bird, which from its Apprehension of Storms they call the *Storm Bird*: this has such certain Knowledge, and such Dread of a Storm, that it never fails to make immediately to the Shore when it is near, on the Approach of Danger; but at open Sea it follows Ships, giving Token to the Sailors of many an unexpected Storm. The Guidances these Creatures receive from Instinct are very surprising, and they were intended by Providence not only to be useful to themselves, but to Mankind in observing them. This little Bird seeks the Shore, when in Reach, before the Approach of a Storm: and when too far from Land, it gets behind a Vessel for Shelter. The Sailors well know they have a Gale to expect when they see it; and the Farmer should have the same timely Caution to prepare for the Defence of his Crops in Danger.

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### CHAP. XVI.

*Of the Damages done by Winds to Husbandmen in their Crops.*

**P**LANTS may receive Injury from Winds at different Periods of their Growth: while young they are so tender, that the Blast will often chill or shrivel them up: when more advanced in Growth, they are more open to its Force by their larger Bulk; and by their standing higher: at this Time they require to be very well fastened in the Earth by their Roots; and the most natural Effect of all others from the Wind is the rocking them about, and loosening of them. This is a Circumstance very little regarded by Husbandmen, tho' very much by Gardeners. In this, as in many of the preceding Instances, there will be the greatest Advantage in bringing the Practice of the Garden into the Field. In new planted Trees the Custom is to tie them up to Stakes: and the Stalks of flowering Plants that rise to any considerable Height, are in the same Manner fastened to Sticks. This is of the greatest Service in both Cases; preserving the Roots quiet and steady in the Earth. We would not have the Farmer follow this Practice literally, by tying up his Corn or other such Growth, but we would have him take the Caution with him of the Danger there is from Winds, though he use another Method of preventing it.

His great Care in most Respects, must be employed in getting strong and thick Fences: in particular Crops there must be particular Cautions, which we shall name.

Of all the Husbandman's Products, there is none which so often receives Damage by Wind as Hops. There are two Seasons at which they are destructive to this Plant: the Blasts of the Spring nipping their Buds, and the Storms of the more advanced Part of Summer shaking them at the Root.

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With Respect to the nipping Winds of the Spring, as the Plants are at that Time not much advanced in Height, they are easily enough sheltered by a good high Pale, or a very close Hedge. With Regard to the Winds afterward rocking them at the Root, the first Defence is to chuse a sheltered Place for the Ground; or plant some tall Trees that may shelter it: and for all succeeding Time the grand Security of the Plants is the fixing the Poles deeply and firmly in the Ground.

Corn is in the same Manner exposed to Damage from Winds, not only when in the Ear by lodging, which principally happens from Winds and Rain together, but while in the first Shoots; for the sharp Winds sometimes destroy in a Manner the whole Produce at this early Period. Experience shews, that it is in open Fields the Crop is most liable to this Mischief; and Reason therefore speaks, that the same Remedy will preserve it in both States: this is a good Enclosure. Different Soils require different Kinds of Shrubs for Hedges; and we have in a preceding Part of this Work, given the Farmer his Choice of a vast Variety of Kinds for this needful Purpose; indeed so many, that there is not any possible Disadvantage to which his Land can be exposed in this Respect, which has not in Nature its Remedy under this Article, and which we have not endeavoured to lay before him.

When a Plantation of one Kind does not succeed for this Purpose, it will be very proper that he try another; and when he is doubtful of the Kind that may be best, it will always be right to plant two. Most of the Hedge Shrubs that we have recommended, will grow as well two together as singly; and in this Case if one succeed, it will answer the Purpose; and if both, so much the better.

When there is Danger of a common Plantation not succeeding, from the Dryness and Barrenness of the Ground, it is always a good Caution to sow Furze on the Side of the Bank. If the Hedge succeed perfectly well, this may be pulled up; but it rarely does so well but that a Bottom of this bushy Plant may be an Advantage. The Winds that nip the Winter Corn in the Blade, get in more at the Hedge Bottoms than elsewhere; and nothing better than this fence against them.

These are Accidents the Farmer is always to be aware of, and therefore the Preparation should be made every where; and every Field will fare the better for it.



## C H A P. XVII.

### *Of the Nature of Blights.*

HAVING laid before the considerate Husbandman such an Explanation of the Effects of Changes in the Air, and of the Means of guarding against them, as we hope may serve in general Circumstances for the Preservation of his Cattle and his several Growths, we come now to consider the particular Accidents to which each Kind are liable: and in the first Place those which affect his Crops.

The first of these, as the most hurtful, is that which is very commonly known, but very little

understood, the Blight. We speak of it familiarly, because it is common: but among the many Things that have been conjectured as to its Origin, very little said has any Foundation in Fact.

It is a common Error in these Researches, to take those Things for Causes which are only Effects: and nothing so much perplexes the Attempt to Knowledge.

As we have proceeded on other Occasions we shall on this: we shall suppose, that in order to the remedying an Evil, the first Step should be to understand its true Nature and real Cause; and this we shall endeavour to follow in the present Instance.

Among the Variety of Thoughts that have been delivered to the Publick on this Head, the Husbandman, whose laudable and useful Curiosity should lead him to search after the Cause of this Disaster, would not know which to adopt: we shall cursorily name to him the principal of those which have been received at different Times, and point out what Experience joins with Reason to determine.

The Blight is a Disorder that affects Trees and Plants, and is as terrible to the Gardener as the Farmer. It appears in various Forms according to the Degree, affecting sometimes entire Plants, and sometimes only Parts of them. It is the same Disorder which the Vulgar call a Blast.

When it strikes a tender Plant, sometimes the whole perishes; and in some Cases, the whole Border of a Garden, or the whole Produce of a Field, is lost at once. At other Times it strikes only a Part. The Leaves of Trees often fall off by this Means, while the rest is unhurt; and sometimes the same happens to Plants of lesser Growth. Sometimes the whole Quantity of the Leaves are attacked, and sometimes only a Part of them. The Leaves that are tainted by this Accident, shrivel up and appear scorched; and the Part of the Tree or Plant which is thus struck with it is covered with little Insects.

This Disorder is common to almost all Plants, and to all Parts of the World: we read of Blights wherever we read of Gardening or Husbandry; and for more than two thousand Years Men of Ingenuity have been guessing variously at the Cause.

The GREEKS, who, according to THEOPHRASTUS, called it ERYSIKE, looked on it as a Stroke from Heaven; utterly incurable and incapable of Prevention. The ROMANS called it ROBIGO; and as they deify'd Plagues and Fevers, worshipping every thing they feared, like modern INDIANS, their fanciful Imaginations found a Deity upon this Occasion; they called the new-made God ROBIGUS; and VARRO solemnly invokes his Blessing, that Blights be kept from Trees and Corn.

In general it was attributed to the East Winds; but VIRGIL, whose Husbandry if it were better understood would be more followed, with much more Reason lays the Cause of it to Want of Care and right Culture; and, instead of praying to an imaginary God, advises the Farmer to betake himself to his Labour. It was not Want of Piety in this Poet, that referred him to the Use of Labour rather than foolish Rites. In this Case he orders the Farmer to pray for seasonable Showers; and 'tis only the Worship



of an imaginary Deity, the Creature of Fear and Folly, he derides.

The early Notion of attributing Blights to East Winds, has been continued to this Time; and the Curious seeing Insects in such Abundance on the Leaves and Branches that have been struck, suppose these East Winds brought the Eggs of those Insects, and that they are the Cause of the Distemper.

Others have attributed the Cause of Blights to drizzling Showers freezing upon the tender Buds, and that Way destroying them: in both these Conjectures there is some Foundation; but they err contemptibly who attribute this Disaster to the Aspect of the Planets. The Accounts however given by those who maintain the other Opinions are of little Consequence, for they agree with only one Part of the Subject. They attempt to explain only the Blights of the Spring, for both the sharp cold Easterly Winds, of which they complain, are most peculiar to that Season; and the freezing of drizzling Rains upon the Buds can happen at no other. But there are Blights, and those terrible ones, at Seasons of the Year very different from these. Corn is often blighted in its full Growth, in a wet Summer. Therefore this Accident may happen without Frosts, or without those very sharp and cold East Winds, which though they frequently attend it, we perceive by this are not the Occasion of the Accident.

In the same Manner those Blights which are called Fire Blasts, and are the most terrible of all to a Hop Ground, happen in JULY oftener than at any other Time.

### CHAP. XVIII.

#### *Of the antient and modern Observations of Blights.*

THIS shews that the Cause is not what these Persons have thought, and therefore that the Farmer must seek farther than their Advice for a Remedy. The same Accident that happens in this Manner in our Hop Plantations, us'd to damage the Vineyards of old ITALY. The Authors on Country Affairs, name it with great Marks of Concern; they distinguish it by the Name of Carbunculus, but this we find both by the Context and their own Account of the Disaster, was the same with the Robigo or Blight. Storms, PLINY says, were less terrible to the Vintage than this Blast, for they affected only particular Places; this cut off whole Plantations.

The Time of this terrible Damage happening to the Vineyards, appears to have been the very same with that in our Hop Grounds, and the Circumstances also the same. Ours happens toward the End of JULY, and theirs come on toward the ripening of their Grapes. What we read particularly of it is; that it generally followed violent, sudden, and short Showers, which happened about Noon in that hot Season, and were followed by clear Sunshine. They add, that it was sometimes partial, sometimes universal: that when it was partial, 'twas the

Middle of all the Vineyards that suffered, and when it extended through the whole Ground, it always was plainly perceived to have begun in the inner Parts, and there to have been most severe.

This is the Account of a violent Blight in the Heat of Summer, in the Vineyards of ITALY, two thousand Years ago; and if we compare with this the exact and judicious Observations of Doctor HALES, made upon our ENGLISH Summer Blights in Hop Grounds, We shall see the antient\* and the modern† very happily explain and illustrate one another: and the Farmer will thus, better than any other Way, be led toward the Discovery of the real Cause of the Disaster.

\* Colu-  
mellade Re  
Rust.  
† Hales  
vegetable  
Statistics.

No Plantation can so much resemble that of the antient Vineyard, as our modern KENTISH Hop Grounds: the Season for their Carbunculus is the same with that of our Fire Blasts, and the Circumstances attending both perfectly correspond. The Observations of our ENGLISH Philosopher are, that when there has been Rain, and a hot Gleam of Sunshine immediately followed it, the Fire Blast has happened: that it has attack'd the Plants in the Middle of the Hop Ground particularly, scorching them all up in a Manner from one End to the other.

The Damage in this Instance happened a little before Noon; and the Blight or Fire Blast ran in a Line at right Angles with the Sun Beams at that Time of the Day. There was little Wind; and that which did blow was in the Course of the Blight, or according to its Line. Those who would enquire into the Nature and Cause of these Disorders in Plants, are extremely obliged to the Author of these punctual Observations; for comparing them with what we find in these old Authors, we find that the Nature of Blights is a fixed and certain Thing; that they appear in the same Manner, and observe the same Course, and that they plainly arise from the same Cause in the most remote Parts of the World.

This shews their Origin to be always, and every-where, from the same Principle; and it is not impossible upon so much Observation, to make a probable Conjecture what it is, and thence to attempt a regular Method of preventing its Damage or defending Plants and Trees from it.

This we shall endeavour to trace and direct in the most punctual Manner.

### CHAP. XIX.

#### *Of the real Cause and Origin of Blights.*

BEFORE we enter on this Enquiry into the Cause of Blights, we must warn the Husbandman that he distinctly understand what is signified by that Name. We have mentioned the Circumstances and Manner of Appearance of Blights, and these, according to those Circumstances, we are about to account for; but we must remind him that many, for want of Consideration, confound together under this Name almost



almost all the Disorders to which Plants and Trees are liable.

A Blight, distinctly and properly so called, is a Damage suddenly happening to Trees and Plants, which appears in the Manner of burning, scorching, or shrivelling up the Leaves, and often withering the young Branches. This we have shewn happens sometimes in Spring, sometimes in Summer; and this is what is properly called by the present Name: if any call a Growth of whatever Kind blighted, because it is starved, or distinguish by that Name the Damage done by Frosts upon too early Blossoms, they are to be told these Disorders of Plants and Trees come under the Heads of Accidents from Frost, and Accidents from want of Nourishment, and will be treated of distinctly as such. Therefore what is here mentioned under the Article Blight is a distinct Thing, and it is of the Cause of that alone we treat in this Chapter.

This Blight sometimes affects a whole Plantation, or at least the whole internal Part of it, and sometimes only here and there a single Plant. In the first Case, which is of the greatest Consequence, it depends in some Measure on the Nature of the Plantation, and therefore may be remedied or prevented; in the other it arises from Causes quite out of our Power, and we cannot do any thing to obviate the Mischief; but it is of the less Importance, because it affects but a small Part of the Crop.

The Blight which we have described as affecting the inner Parts of Hop Plantations, and which the Antients mention as destroying their Vines, will also destroy whole Crops of various Kinds in the Field: we shall see the Cause of this, and therefore may reasonably propose a Remedy.

As it affects the inner Parts of Plantations first and most, and as it follows Rain, there is all possible Reason to believe it is the Effect of a Vapour raised in Abundance in those Places, and stagnating there; on which the Sunshine operates to the Destruction of the Plants.

If this shall appear upon farther Enquiry to be the true Cause of Blights, the Remedy will follow plainly. It consists in nothing more than keeping the Plantations clearer: setting the several Plants at greater Distances, and giving the Air free Way between them.

If the Outfides of the Hop Plantation escape, while the inner Parts are destroyed, what is the Cause of this, but that the free Air coming to the Outfides dispels and scatters that Vapour, which stagnates in the close Parts of the Ground, till the Sun, by its Means destroys the Plants. This plainly is the Case, and there is no other, nor can Reason propose, or will Experience vouch for any other Course. Therefore the Remedy will be to make the Plantations more open and free to the purifying Air. Moderation is to be used in this.

We know that Hop Grounds must be sheltered from high Winds, or all will be destroyed; but at the same Time that they are sheltered from the worst Quarters, they may be left open on some others; though they are to be defended, they are not to be smothered up. This is the Effect of over Caution in weak Minds, but no-

thing is more dangerous. Let the Farmer in this Case, and all others, take Care that he avoid the common Mistake of running into one Fault in shunning another; it is in this Case, as in many others, running into a worse.

When the Ground is so disposed that the Air can have free Ingress to all Parts of it, there will be nothing to fear from the Fire Blasts of Summer. What is observed of the Hop Ground in this Case, holds good of all other Plantations: I only name that here because this is the most particular, and in which it is most plainly shewn.

The Way to give the Air this free Ingress and Passage, is to place the Hills at greater Distances than usual. We have laid down the best Distance in general Instances treating on Hops; but let the Farmer observe, that in Cases where the whole Ground is more enclosed, the Passages within must be opener.

Too close planting is most of all destructive to Hops, by bringing in these Blights, and Fire Blasts, because the Hop is so tall and large a Plant: but in all others it more or less affects them in this Case, according to their Height and Manner of Growth, and according to the Exposure of their Situation.

The Summer Blights of Corn, and all other Crops, are owing to this same Cause, the Plants standing too close; in this Case the hot Sunshine following large Showers, blights whole Fields.

The Caution to be given the Farmer is, that he plant all his Crops thinner than the usual Custom; and this we have recommended to him already, and have shewn him that his Produce will not be less, but greater for it. As this must be his general Caution, so in particular he must observe, that where the Place is most close the Distance of the Plants must be the greatest.

This Caution recommends the Horsehoeing Husbandry as a Cure for Blights, and indeed there is none so certain or so great. Who ever saw a Field of any Crop treated in this Manner, blighted: 'tis not only the clearing the Ground between the Plants, that gives them this Advantage in the Horsehoeing Husbandry, but the affording them more Nourishment, that helps greatly. Starving and blighting are two distinct Things; but a starved Plant will be sooner blighted than one that is strong and flourishing.

The Husbandmen of old Time were aware of this; for VIRGIL prescribes but one Remedy, which is Labour. Indeed this is one great Reason for our recommending the new Practice of planting at Distances, and breaking the Ground between for almost all Crops. The Plants are by this supplied with abundant Nourishment: no Weeds rise to starve them; and they cannot starve one another; and the Seasons and Elements are admitted to their Good, but can do them no Harm. The Showers are imbibed by this free and broken Earth between them, better than any other Way, and what is evaporated has the open Air to expatiate in, and goes off blended with it.

If we would be assured of the Truth of what is here advanced, respecting the Cause of Blights, our Eyes may be made Evidences. Let any Man look into a Hop Ground on a Sunshining Day,



Day, after great Showers. In the Middle of the Ground, and every where when the Plants stand thick and close, he will perceive these Vapours rising in Abundance, and hanging with a quivering Motion among them like a light Smoak, where there is no Wind: if he look at the rest of the Plantation, through them it appears dim and hazy; and if he look through them at a Church or House, or other distant Object, his Eyes will ache by Reason of the confused Look and quivering Motion. Let him then examine whether there be these Vapours about the Outfides of the Ground, and he will find there are not. All is there clear, because the Access of the Air is free, and they blend among it as they rise. The Blights and Fire Blasts follow in the Middle and close Parts of the Ground, and not on the Edges or among the outside Plants. They come where these Vapours have been seen hanging; and no where else. There is this to cause them, and there is nothing else. Therefore in all Reason we must conclude these Vapours are the Cause, and no other.

We see the Occasion, and the Remedy is easy. Let the Air have free Egress as well as Ingress among all Parts of the Crop, whether it be of a taller or lower Kind; and no Blights will be found. This is best obtained by following the Practice of the Horsehoeing Husbandry, but any other Method of keeping the Plants at a Distance, and allowing the Air free Passage between them, will answer the Purpose.

Those particular Blights which fall upon only a single Plant in a Field, or any Part of a Plant or Tree, arise plainly from the same Cause with these general and terrible ones we have described already. Their Origin is an undissipated Vapour. If it be asked, whether little Parcels of such Vapours ever hang about in the Air, those who are accustomed to the Use of Telescopes, can tell us that they do. 'Tis not easy to distinguish such floating little Parcels of Vapour by the naked Eye, but when those curious Persons use these Glasses, they often see them come across their View and disturb the Sight.

One Thing that confirms the Opinion of these particular and partial Blights happening from such little Parcels of Vapours is, that they generally come when there is little or no Wind. A greater Wind would break and disperse them.

This seems to be the true Account of their Nature and Origin, they, like all other real Blights, are owing to Vapours hanging in the Air, through which the Sun's Rays scorch the Plants, and this is not wonderful to those who understand what must be their Power on such Occasions.

#### C H A P. XX.

##### *Of Damages by Easterly Winds.*

WE have shewn what is the real Blight, and what the proper Method of guarding against it, and preventing its great Damage; we are here to treat of all the Accidents to which Crops are liable, and shall therefore begin with such as are called by this Name.

N<sup>o</sup> 54.

There are Spring Blights of the same Nature and the same Origin with those of Summer; the Effect of scorching Vapours kept stagnating in the Air; and heated by the Sun. These are to be prevented in the same Manner as the others; therefore nothing more need be said of them here: but beside these there are two Kinds of Damage done by Easterly Winds; and by late Frosts, which, though called by this Name; are in themselves altogether distinct in Nature; these we shall consider separately in this Place. Easterly Winds in Spring often knip and destroy the tender Shoots of Plants of all Kinds; and they do this Mischief by stopping the Current of the Juices in these young and tender Parts.

The Farmer sees this; and so does the Gardener, for both are equally affected by it, but neither of them understand or indeed look into the Cause.

When the Juices are thus stop'd they swell the young Fibres, and the several Parts of the Leaves burst and wither. The Juices gush out in this Case, and they become the Food of numerous little Insects. Wherever there is Food for these Creatures, Nature yields them in great Number to devour it; and consequently in this Case there are presently seen Abundance of them on the young decaying Shoots.

These Insects are always found upon these damaged Branches; and by a very natural Error they are supposed to occasion the Mischief. The Farmer imagines the East Wind brought their Eggs; and he strews Tobacco Dust over the Crop, or burns wet Straw on the Side of the Ground, from whence the Wind will carry the Smoak among the Creatures. In this he aims to destroy the Insects, as if that would recover his Crop: but he errs from the Beginning. The first Step should have been to guard against the Mischief; and when that has been omitted every following Care is vain.

The East Wind does not bring these Insects; nor are they the Occasion of the Mischief: they hatch where there is Food, the whole Air being full of the Eggs of such Creatures, and they feed upon the Juices which these blasting Winds have stopped in their Current. These harmless Creatures do not eat the Leaves, or tear them; they find them burst, and they feed upon what runs from their Wounds.

The Farmer may know when there is Danger from these Winds, their Effect is by absolute drying and shrivelling up the Parts, and the Destruction they occasion is solely brought on that Way. We know the Effect a drying Wind will have upon any tender Leaf exposed to it, when taken from the Tree or Plant: these young Shoots are thus tender while they are upon the Branches, and the Effect is the same. The Wind shrivels them up. When there are moderate Showers now and then, or when there are but good Morning Dewes, these Eastern Blasts do no Harm. The only Seasons when they are destructive is such as are perfectly dry. Therefore the Farmer knows when he is to fear the Damage.

When he sees a dry Spring, and the Wind set in Easterly, let him go over his Fields and his Orchard, and see what Part of his Crops are

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for



forwardest, for they will be in most Danger. Let him not stay for the Appearance of Insects, but prevent if possible the Effect of the Blasts: and this is to be done by proper Defence and Shelter. The Use of thick Furze Bushes may serve excellently for this Purpose; and they should be stuck in the Ground in close Rows, not only on the Side of the Field where this destructive Wind is likely to come in, but in different Places, at some Distance in the same Direction.

We see the Cause here is so different from that of a common Blight, that the Remedy is to be just of the opposite Kind: in that Case the Wind is to be admitted among the Plants by all Means; because it will carry off those Vapours which are the Occasion of the Mischief: and in this it is to be kept off as much as possible; because it is itself the Cause of the Injury.

This may serve as an Instance of the Necessity there is of the Farmer's understanding the Causes and Nature of all those Accidents that may befall his Crops. We see in the present Case, that by the improper confounding of two Things of contrary Cause and Nature, under the same Name of Blight, he might be led to practise that for a Remedy, which would be the very Cause of promoting and extending the Damage.

We have now instructed the Farmer to distinguish the Cause from the Effect; and having taken the proper Precautions in this Respect, we may lead him to consider the other. When he has sheltered a Crop that may be in Danger on this Occasion, let him from time to time examine whether his Precaution have proved effectual. If in any Place he sees his Plants hurt while they are free from Damage in others, let him thicken the Shelter against that Place; and then, having provided against the extending of the Damage from the original Cause, let him take care that it be not encreased by its natural Consequences.

We have shewn the Insects which appear on Plants nipped by easterly Winds, are not the Cause of that shrivelling and withering of their Parts, but they may very much contribute to the spreading of the Disorder. Wherever they are first hatched they breed extremely fast; and that in a very particular Manner. They do not wait the ordinary Method of Copulation of both Sexes, but they are all Breeders: and the Young produced from them are full of others, which they discharge from time to time, and so on at least for several Generations. This may appear strange to many, and it is one of those wonderful Processes of Nature, in which for particular Purposes she departs from her usual Tract and Course. Mr. DE REAUMUR, of the Royal Academy of Sciences at PARIS, the RAY or SLOANE of FRANCE, had the Curiosity first to discover and trace this wonderful Procedure, and many have since observed it: any one may, for the Creatures are common enough; and if one of them, any one at random, be put into a little Box and kept alive, it will produce its Young; and any one of these Young taken out as soon as born, and kept in a separate Box, will do the same; and its Young after it. The Experiment

has been continued through five Generations. This may shew us how abundantly the Insects on a nipp'd and injured Plant will encrease; and they will spread the Mischief by wounding other Parts of it. An accidental Injury brings them to the Plant, but they are capable of doing a great deal themselves. Having fed upon the Juices that issue out of the burst Vessels of the Leaves, they will pierce them in other Parts in Search of more: and thus the Plant will be full of Wounds. Out of all these the Juices will flow, and they will thicken and grow clammy in the Air: and this being the proper Food of these Creatures; not only their own numerous Brood will from time to time encrease the Mischief, but this Quantity of new Food will occasion the repeated hatching of more and more of the same Kind, brought in the Egg or Embrio as the first were in the Air.

For these Reasons, when the Husbandman has found what Part of his Crop has suffered by the dry East Winds, and has guarded against their farther Damage by improving the Shelter in that Place, let him set to work to prevent the spreading of the Mischief already done by destroying the Insects, and by spoiling their natural Food.

This is not to be done by sprinkling Tobacco Dust, or any such Method; for that will only damage such of the Juices as are already out, and the Consequence will be, that the Creatures will neglect those Parcels and wound the Plant in new Places for more. This shews that the natural Consequence of using this Dust by Way of Remedy, is the encreasing the Disorder; and so I have found it by Experience.

We have observed that dry Winds occasion this Mischief, and it is dry Weather that supports the Insects which appear upon the hurt Plants. Of all the Methods that can be devised for their Destruction, none will be found so effectual as the drowning of them. The Plants should be well watered every Day with a watering Pot, and this repeated constantly till natural Rains fall. It will, if not utterly and entirely remedy the Evil, yet certainly abate, perhaps totally stop its Progress.

We see constantly that Rains destroy these Creatures, and restore such Parts of the Plants as are not utterly destroyed to their former Vigour.

Nothing can be so reasonable, so prudent, or so proper, as to imitate this Relief of Nature by Art, and nothing will have so good Effect. This watering of the Plants will not only destroy many of the Insects, but it will wash off the sweet Juice that hung on the Leaves, and would have brought more: and at the same Time that it is answering these excellent Purposes, it will be obviating the very Cause of any farther Injury from these Winds, by remedying the Dryness of the Season.

The Plants suffer in their Shoots by these Winds, because there is no Moisture to prevent their shriveling up by them: and by this Means that Moisture, so needful to the Ground, is given by the Hand of the Husbandman, though it be with-held in the Clouds. The watering them all over answers this Purpose extremely for the Time when it is doing; but the good Effect is not limited to so short a Continuance. The Vapours



Vapours rising from the wetted Ground soften the Air, and the young Shoots and Leaves are kept in such a Condition of Moisture, as to resist the Effect of parching Winds all the succeeding Day. Let our Farmer on this as on all other Occasions be upon his Guard, that he do not, by an ill managed Application of the Remedy, hurt more than the Disease would have done. Let him remember, that watering in an Evening when the Nights may be frosty, as they frequently are at this Season, may be the entire Destruction of his Crop. He must for this Reason be sure to water and wash his Plants only in a Morning, and he need not fear damaging them then; for the Dryness of the Season will make this useful in every Respect. The whole Day coming after the watering, some will be taken in by the Plant, some evaporated; and the Quantity that remains in the Ground at Evening will not be enough to do the Plants any Damage by the Night's Frost.

Thus many good Purposes will be answered at once by the Method we have directed; and it will not be impossible but that the damaged Part thus managed, may prove the very best Piece of the Ground.

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## CHAP. XXI.

### *Of Damages by late Frosts.*

**W**E have shewn that one of the Accidents which happen in early Spring to the Crops of the Field and Garden, and which is improperly called a Blight, may be remedied by due Care: we come here to treat of another Damage of the same Season, called in a confused Manner by the same Name, but altogether different in Nature. The unexperienced Eye is pleased to see the early Appearances of Spring in the Garden and in the Field; but the more judicious tremble for both. In our uncertain Climate, nothing is more subject to Destruction than an early Shoot: we have Frosts frequently very late in the Spring, and these nip and destroy all such early Shoots. It is therefore our Happiness, when the Seasons are more regularly separated from one another; when the Winter takes its Time, and the Spring begins late enough to continue uninterrupted.

When it has happened that a Crop of tenderer Kinds has shot briskly from some early soft Weather, the severe Morning that follows nips the tender Leaves and they fall off, and not unfrequently the young Shoots with them: this is a Stoppage in the Growth that retards it vastly, and that is very difficultly recovered.

We see the Occasion of this Damage, and the Consequences; but nothing is so difficult as to propose a Remedy for it.

The Gardeners, whose Blossoms and young set Fruit are frequently injured by this Accident, have Recourse to a Method of Prevention which increases the Disease. They cover up the Trees with Mats, and thus indeed defend them from the present Frosts; but they make the Shoots by this Means so weak, that they are sure to be destroyed by the next. If the Farmer could any

Way imitate this Practice, it would be by scattering Straw or Haulm over some tender young Crop: but in this Case, without the utmost Care, more Damage would be done than Good. If he ever should be tempted to follow this Practice, there is but one Way of doing it safely, and that is attended with a great deal of Trouble: he must have this Covering of his Plants scattered slightly on every Night, and removed every Morning; raking it together in separate Heaps, from whence it must be thrown upon the Crop again in the Evening. If it were suffered to lie on all the Day, the Plants would be drawn up so weak, that like the Shoots of the Trees in the Garden, they would be sure to be destroyed by the next Frosts.

Though we can fence off Winds, and wash away Insects, we cannot command the Temperature of the Air; nor is there any Way of defending our young Growths from it other than what is just named: but we have on all Occasions warned our Husbandman to be wise betimes; and in this Case more than in most others it is necessary.

Let him before he commits his Crop of whatever Kind to the Ground, consider the Dangers to which it will be exposed; the Methods that he shall have in his Power for guarding against them; and the Chance of the Advantage from early Growth; and of their Destruction or Escape. 'Tis thus he will be able to judge, and no otherwise, of what is the proper Method of acting.

Some of his Crops are required early, and to others it is of little Advantage: this we have before explained under the particular Articles; and let him well consider it in this Case. The earlier he sows, the earlier his Crop will rise; and the sooner in Spring it is up, the more it will be exposed to this Danger. Let him run the Hazard; for none but such as will, have a proportioned Benefit from their Forwardness: and with respect even of these, let him be moderate; for it is not being out of the Ground at an extremely early Period that is so advantageous. The great Benefit arises from so contriving the Crops, that they will be in a Condition of Growth upon the earliest Setting in of proper Weather. This he can only know by Guess: but having formed the best Conjecture he can, let him sow accordingly; and if when the Crop is up the Frosts threaten, let him defend it in the Manner we have just mentioned.

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## CHAP. XXII.

### *Of Damages from Weakness and Starving.*

**W**E have observed that among the many Disorders of Plants, comprehended under the Article of Blights, in the common Way of speaking, one was that of Weakness in the Growth from some Accident, which starved it.

The very same Effect which we see produced by a real Blight, we sometimes also find attending this Accident; and the Account for it is very



very easy. In that Case a thick Vapour, by Means of a strong Sun, has shrivelled the Leaves, and scorched the tender Stalks of a Plant: and in this a like Accident happens from the Want of Nourishment. Those Parts nearest the Root are best supplied with Juices, and therefore they are full, flourishing, and fine; while such as are farthest off from that Source of Nourishment, wither when there is not enough to feed all alike.

'Tis the same in this Case as in the Human Body: when the Heart cannot drive the Blood through all Parts; those farthest from it suffer first, the Hands and Feet have the Juices first stagnate in them; and in the same Course in the Plant the Tips of the Branches, and those other Parts most remote from the Root are first affected in the Case of starving.

We name this for the Farmer's strict Observation; because it will let him into the Nature of the Disorder, without which it is impossible for him to find the proper Remedy. When he examines what is called a blighted Crop, let him look carefully to this: no Matter that Insects crowd, and Leaves curl up; and that all the Signs of real blighting appear: if he perceives all the Tips of the Stalks and Branches affected; and few other Parts, he may be sure the Disorder is no Blight or Blast, but a Stagnation of the Juices in the Tips or Extremities of the Plant, for want of a fresh Supply to force them on in their natural Course.

Although there is not a Circulation of the Juices in Plants, as some have supposed, there is a continual Motion forward to the Ends of the Branches, where a great deal is discharged by Perspiration: this we have shewn in a former Part of the Work. This Motion of the Juices is altogether necessary to the healthful State of the Plant; and whenever it ceases the Part in which it is kept becomes diseased.

Knowing thus much of the Oeconomy of Nature, in the Management of Plants, we shall not find it strange that this Stagnation of their Juices happens from starving. When the whole is in a flourishing State, the Root takes in a great deal of Moisture, which it sends upward in a constant Motion, and this drives on the rest. When there is not enough of this received, and the Plant is not vigorous enough to throw it upwards, this Motion grows faint. The Juices stagnate and stand still in the extrem Branches: and where they stagnate they always burst the Vessels by the Sun's Heat, and sweat out.

This is the Signal of Nature to all the Insect Tribe together. Their Eggs or Embrios are floating every-where in the Air; and wherever there is Food for them they stick and hatch into Life; and they breed abundantly. These come therefore wherever there are corrupted Juices in Plants; and their Appearance is as natural from starving as from scorching of the Plants: from this it has happened that both Accidents are called by the same Name by the Vulgar; but let the Husbandman learn the Difference, because they require altogether distinct Remedies.

When the Cause is seen to be a Defect of Nourishment, and not a scorching Vapour, the

Remedy is natural, but it is not equally easy to be applied in all Cases. The Farmer will here see another Instance of the Excellence of the Horsehoeing Husbandry. This Sort of Blight, as it is called, may always be remedied presently in that Method, because it is in our Power at any Time to give the Plants a due Supply.

What cannot be done so well in the common Method, yet must be attempted in the best Manner in the Farmer's Power upon the same Principle.

It will rarely happen that a Crop raised in the new Husbandry is subject to this Disorder, but when it is the Remedy is to send in the Hoe Plow, and tear up the Ground to a good Depth between the Rows. This giving the Plant abundant new Nourishment, as we have shewn, the Disease is remedied at once. The whole Crop shoots strongly; and the little Insects, whose Food depends upon the starved Condition of the Plant, drop and die off of themselves.

This is the short End of a starved Condition from Neglect in the Horsehoeing Husbandry, for be the Soil what it will, starving can only be the Result of Neglect in that Method. The Earth being broken small is ready to receive the Dews and Rains, which will wash its new brought Nourishment into the Roots; and the Roots will be sent out in vast Multitudes to receive it; for the Consequence of this plowing near them is, that their Roots are all cut off at the Ends, as those of a Plant new set by a Gardener, and they shoot out innumerable others in Consequence. This we have shewn before to be the Fact, in numerous Instances, and remind the Farmer of it in this Place, that he may understand how perfect a Remedy is this Way in his Power.

When a Crop of some of the large growing Plants, for they are most subject to this Accident, are thus endangered by starving in the common Course of Husbandry; the Hand Hoe is all that can give them Assistance, and it must be immediately employed. There is in this Case no clear Interval for cutting deep into the Ground, but what Space there is between Plant and Plant, must be clip'd as well as it can at the Edges and Surface. This will have some Effect; and indeed, if wisely and boldly employed, may have more than the Farmer will at first expect.

What has assisted to the starving of the Crop in this Case is, probably either a large Growth of Weeds among the Plants, or their standing too close to one another.

In the first Case this Hand Hoeing is a Remedy, because all the Weeds of what Kind soever, will be cut up by it; at the same Time that it breaks the Ground between the Plants, and cuts some of their superficial Roots. But let the Farmer not stop here, in this Case of starving, most probably the Plants standing too close has been the Occasion of it; or if not no Way is so sure to recover one half, as to cut up the other. This will give the Hoers Leave to work more boldly, and give more Scope to their Strokes, that they can cut deeper: the Earth will be more broken, and the Air, Dews, and Rains better let in: the Wind will be able to blow fresh between the Plants also, and every thing will thus tend to their Recovery.

Let



Let not the Husbandman grudge the Part of his Crop that is to be destroyed. DARIUS did well to offer half his Kingdom; and it would have been happy for him if ALEXANDER would have accepted it, and left him the Remainder. In this Case the Question is not whether the Farmer shall have half or all; but whether he shall have half or nothing. I have thus seen a Field of Coleseed sowed to the Owner in NORTHAMPTONSHIRE, when every body gave it up for lost; and I really believe it yielded him more Seed from the half, or less than half the Plants that remained, than it would have done from the whole, if they had gone on ever so well in his crowded Method of planting them. In this Case, as in some others that I have seen, I am strongly of Opinion, that a great Part of the Mischief happened from the sowing so thick, that the Plants choaked and starved one another: and it is certain, that there is no Remedy like thinning them to a proper Distance. When the Husbandman shall see the young Plantation we have directed for his Orchard decaying in the same Way, let him pursue the same Method of Relief as we have directed in Case of Crops, by the Horse-hoeing Method.

In the common Plantations he must dig round the Trees with a Spade, breaking the Earth well, and throwing it in carefully and lightly: but in our Method of planting distant for cultivating the Land between, let him bring in the Plough, let him bear very near the Roots of every Tree that is in this sickly Way, press the Plough deep, and make the Share, as VIRGIL says, shine from the Furrow. This will give new Nourishment and new Life to the Plantation; and thus in every other Article, where the Mischief plainly happens from a starv'd Condition, let him give the Crop a more abundant Nourishment, and make it shoot strongly. This done, he need not trouble himself about the Insects; for, as the Doctors say, when the Cause is taken away, the Effect ceases.



### C H A P. XXIII.

#### *Of the Nature of Mildew.*

THE Farmers are imposed on in nothing more than the Names, Nature, and Causes of the several Accidents to which their Crops are liable: and while they are not rightly informed in this Respect, they can never attempt any thing rational for their Cure. They hear certain Words continually repeated as the Names of various Accidents; but those who speak, and those who write, confound them one with another: we shall shew them distinctly what each Name means; what each Disorder is; and what Remedies are in their Power. Nothing is more needful to the Husbandman than this Knowledge, and nothing is more wanting.

Some have asserted, that Blights and Mildew are the same Thing; but these err, for they neither are the same in their Nature or Consequences: neither are the same Remedies or Precautions proper; therefore this is a very hurtful Error.

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Others differing from these too widely, in the Vehemence of exposing their Error fall into another of as bad Consequence. They say they are not at all alike in Cause, or in their Nature. This is palpably a great Mistake; for they are alike in some Respects, though they are not the same.

We shall endeavour to set the Husbandman right in this important Article; and in order to it shall refer him to what he sees in Nature, not what he may have hitherto read in Books. Indeed the first Step toward his arriving at the Truth, must be his understanding the Errors which have been delivered to him as the real Accounts of the Accident.

Nothing can set the common Class of Writers on this Subject in a meaner Light, than the observing in the present Instance how they have transcribed Mistakes, and copied unmeaning Words from one another.

Old MARKHAM fetches Mildews from the Heavens. He attributes them to baleful Influences, and malignant Vapours of the Sky; which striking to the Earth alter its sweet and pleasant Nourishment, and change it into Bitterness and Rottenness; whereby the Corn is slain outright, or rendered withered, lean, and all unkindly\*.

This Doctrine passed for current, till the succeeding Days of WORLIDGE, who searching nearer Home for the Disorders of his Crops, attributes this to a fat and moist Exhalation from the Flowers, and other Parts of the Vegetables, condensed by Cold in the upper Region of the Air, and thence falling upon Plants again†.

The Language of MARKHAM is florid in his uncouth Way; and that of WORLIDGE is familiar enough. In general, the farther People in these Studies deviate from plain Language, the farther they depart from Utility: these are Writings meant to inform the Mind, not to please the Imagination. The Fields may laugh and sing in Prophecy, and VIRGIL may have Beauty in his *intercunt segetes* §; for his Georgicks are Poetry: but these are not the Expressions which should be used in laying down the practical Rules to the industrious Husbandman, and explaining their Uses.

WORLIDGE has delivered his plain, original Conjecture, and many have adopted it; for MARKHAM's was the Error of his particular Age, and could not be well received in any other.

Industrious MORTIMER has copied honest WORLIDGE, not his Thought only, but his Words||; not so much as attempting to reason or improve upon him. WORLIDGE, though not exactly right himself, yet laid a Foundation on which a little plain Sense and good Observation would have arrived at the whole Truth.

From MORTIMER; CHOMER translating this imperfect Account, \* conferr'd a lasting Obligation (such were the Words) upon his Country; and from CHOMER, 'twas englished back again, under the Auspices of BRADLEY †.

Thus we see how many write, and how few think: how Error goes the Round of different Nations: that which was old in BRITAIN, after it had appeared new in FRANCE, grew new again

\* Book 2; p. 81.

† *Syst. Agriculture*; p. 209.

§ Book 1.

|| *Art of Husbandry*, b. 7. p. 303.

\* *Dis. Oeconom.*

† *The same Work translated into English, Article Mildew.*



‡ *Encyclo-  
pædia.  
|| Garden-  
er's Dict.  
Article  
Mildew.*

again at home, in the Translation of that first Translation. From these, unaltered, unimproved, and unamended, the Account made its Way into the Compilations of CHAMBERS ‡ and of MILLER ||; and from them into the patched Productions of still later Writers below Contempt.

This is what the Farmer meets with, if he have Curiosity to read for Information. This was the State of useful Knowledge in a Country famed for its Improvements during almost a Century. The first rational Advance he is to make toward Truth, is, by seeing the Errors and the Imperfections of these Accounts; and the next is, to read it in the Book of Nature.

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C H A P. XXIV.

Of the real Cause of Mildew.

WE have shewn the Husbandman that the first Accounts of Mildew were erroneous, and that the later have been all imperfect. It is not true that Mildews are sent down from the Clouds; nor can they ever be understood by those who join the Exhalations of the Earth and those of Plants together for their Cause. Let the Farmer look out into his Fields, and when he sees a settled Mildew on his Crop, he will find Insects, just as in the Case of Blights, feeding upon a Honey-like Moisture lodged on the Plants; and where it is but beginning, he will find this Moisture tho' less thick, yet sweet and clammy, covering the young Shoots, tho' the Insects have not found it.

This shews him, that the Cause of Mildew is the hanging of a thick sweet Moisture on the Plants; here is his first Step to the true Knowledge of the Disorder; the next is to enquire whence this Liquor comes, not from the Clouds or Skies, according to MARKHAM; for only pure and simple Water can get thither, nor did any thing else ever descend from thence: neither can such a Juice rise from the Earth, as WORLIDGE fancies, for there is none such there. Waters may be impregnated with Minerals, and their Virtues may rise with them; but there can be nothing of the Honey-kind raised from thence. The Earth can send up nothing but what it has, let the Sun's Power be what it will; and it has not in it the sweet Juice which occasions this Accident.

To understand this rightly, let the Husbandman perfectly inform himself what this sweet Liquor is; it is but one Thing in whatsoever Form it appears. Whether it be solid or liquid it is the same Substance; and whether we see it in the Form of Honey from the Bees Stores, of Manna from the Ash Trees, or of Sugar from the Reed.

We see there is such a Substance in Nature, and but one such; and, to understand this Disorder which it causes, let us enquire whence it comes. It is not dropp'd down from the Heavens, nor drawn up by the Sun from the Ground; this we have shewn: there remains but one way it should come, and therefore that must be the true Source of it. Since it is not originally in the Earth or Air, it must be produced

in the Bodies of Plants; and that is its true Origin.

The Juices of the Earth are received into the Roots of Plants; and these, as we have shewn in a preceding Part of this Work, are only Water and the fine Part of Mould, and of Manure: Water alone will, to many Plants, answer the Purpose.

Of whatever Kind they be in any particular Instance, whether Water alone, or Water and pure Earth; or, lastly, Water, Earth; and the fine Part of Manure, they have nothing of this sweet Taste, nor of the Honey or Sugar Nature. They are received into the Vessels of the Plant, and there, by an Operation to be admired, not to be understood, they are converted partly into the solid Parts of the Herb, and partly into these sweet Juices.

We know this is done, because tasting these Substances first we find they are not of this Nature; and examining the Juice of the Plant afterwards, we find that is such; but we cannot enter into the Secrets of Nature so far as to find how it is done. Let the Farmer, more humble than the Philosopher, be sensible of this, and know where to stop his Enquiries. It is enough for all useful Purposes, that he knows this Juice is there, no Matter how it comes. This sweet Juice of Plants is extracted by the Bees from their Flowers, in its own proper Form, and lodg'd in their Combs as Honey. From the Sugar-Cane, the Juice being boiled down, leaves it in Form of Sugar; nor is that peculiar to this one Plant: the Juice of the Maple-kind is, in some Parts, boiled to Sugar, in the same Manner; and that of the Birch, or any other Tree, or Plant, properly managed, may.

This Juice, which is thus separated in the Flowers, or lodged in the Sap, may shew itself on the Outsides of the Leaves and Branches. It does this on the Oak in our Country, and is there called Honey-Dew; and in ITALY, particularly in CALABRIA, it does the same on the Leaves and Branches of the Ash, and is called Manna. This is the Circumstance that comes nearest to our present Purpose. In the Course of Nature this sweet Liquor should be kept among the Sap, except the little that is separated in the Glands of Flowers; but we see that in these two Instances it will shew itself in a separate Form on the Leaves.

It is not the Oak alone in our Kingdom that has this Honey-Dew upon its Leaves; nor is the Ash the only kind that has it, in hotter Countries, in the shape of Manna. The Manna of BRIANCON in FRANCE, is gathered from the Larch Tree, and that of PERSIA from the Alhagi, yet these are both true and genuine Manna.

This Juice, which is thus contained in all Plants, may by Accident be brought out to the Surface, and being there dislodged, it will shew itself first in a clammy Moisture; and afterwards, according to the various Circumstances, in a tough Matter like Honey, or in a dry and firm Substance, as Manna. Experiments have been made to prove that the FRENCH Manna did not come from the Clouds, but was the real sweet Juice of the Plant, which perfectly settles this Question. Boughs have been cut off clean in

in the Manna-Season, and the Manna has been found upon them some time after, tho' they had lain within Doors.

This, and many other Observations of a like Kind, shew that the sweet thick Substance found on Plants, is not rais'd from the Earth, or dropp'd from the Sky, but is sweated out by the Plant itself.

Trees can bear this better than tenderer Herbs, and to this is owing the Difference of its Effects, in not hurting the one Kind, and injuring greatly the other.

This sweet Juice is the Cause of Mildew; and the Farmer knowing its Nature and Origin, will rationally be led to enquire into the Manner of its doing the Damage, and thence to the proper Remedies.



C H A P. XXV.

Of the Accidents which bring on Mildews.

THE Reader will see from this plain Account of the Cause of Mildew, what is the Difference between that and the Blight: we have shewn that it is occasioned by a Condensation of the Juice of the Plant within, and this from a Sweating of it out. 'Tis seen, therefore, that though not the same Disorder, they are allied in their Nature; but as their Causes are different, so are their Methods of Cure.

The Cause of Blights is often a cold Wind; but the Occasion of Mildew is frequently a hot Sun, and a perfectly still Season. This agrees very well with the rational Account of the Nature of these Accidents; for Cold is most likely to coagulate the Juices in the Vessels, and Heat to draw them out of them.

The poorest and even weakest Trees and Plants are most subject to Blights, because in them there is the least Force of Nature to carry on the Motion of their Juices against the Effect of Cold; but, on the contrary, the richest and strongest Plants are most subject to Mildew, because they bear the richest and the most abundant Juices. From these Observations, conducted by a first established Knowledge of the Principle and Cause of the Disaster, we see the Errors of the Conjectures made by others, and the unhappy Effects they have taken upon their Practice.

Where most Manure and most Tillage are used, the Plants will be richest: and where, with equal Tillage, there is more Manure, those Plants will, in the natural Degree, be richer than where there is less. On this is founded the Observation, that where there has been most Dung used, the Crop is most subject to Mildew. But those who have credited the Accounts heretofore given of this Accident, being occasioned by Vapours from the Earth, have been led into a very erroneous Imagination by it: they have thought that the Vapours of the Dung caused the Mildew; whereas that Manure had indeed done nothing but its proper Office, and the Crop had fallen under this Misfortune from the great Richness the Plants received from it. Upon this Principle the Farmer will see that a good Quantity of Ma-

nure will defend a Crop from Blights; and tho' it makes the Plants more liable to Mildew, that may be guarded against by other Measures.

Let the Husbandman keep in his Mind the distinct Nature of the Blight and Mildew, for this Reason: he sees they require a different kind of Caution; and in starving his Crop to prevent the one, he may run it into the Danger of the other.

There is at all Times a great Quantity of Moisture exhaled from Trees and Plants, and the abundant Discharge of this, when there is not a due Supply, may occasion both the Accidents of Blights and Mildew; the first in the Spring, the other in Summer. It is the Opinion of Dr. HALES, that when the Moisture is exhaled from Trees, in a cold Spring, faster than it is supplied from the Root, this occasions that Blight in which we see the Blossoms and Leaves of Trees fall in Spring*: and, on the other Hand, when in the Heats of Summer the Quantity exhaled is vastly great, and the Plant is rich in these sweet Juices, they may be exhaled when there is not a sufficient Supply of the others; and this the more, the greater the Heat is, and the richer the Ground has been made by Manure.

* *Vegetable Statics*, Vol. I. p. 368.

This is an Accident in the Course of Nature, which often happens without any Damage following it; but when the Weather is less favourable there is great Mischief: this being the real Cause of Mildew.

In the Heat of the Day this sweet Juice comes out; and while the Heat continues it is not much perceived. It must have been rendered thin, in order to its getting out of the Vessels; and the Heat which effected that Change in it, keeps it in the same Condition, during the Time the Sun is above the Horizon.

At Sun-set this Juice would thicken from the cooler Temperature of the Air; but then the Dews cover the Surface of the Plant with Water; this blends with the thick Juice which lies on the Leaves, and washes it away.

Whatever has been once dissolved in a watery Liquor, will readily dissolve in it again; and as this thick sweet Matter was originally mixed with the watery Juices in the Vessels of the Plant, it naturally and readily will mix with the Dew, which is also watery. This is Philosophy, and this is Truth: the plainest Words best convey Knowledge.

The Farmer sees the natural and proper Course of Things, and in this there is no Accident. No Mildew is seen upon the Plant, tho' the Honey-Juice has been exsudated, because it has been washed off again before it had Time to do Mischief.

If it had lain longer, it would have spread itself over the Surface of the Plant, stopped up its Pores, and spoiled its Growth; and it would have invited Insects to feed upon it, which would have spread the Mischief farther, as we have seen in Blights.

When the thick Juice is thus quickly washed off the Plant, no Harm happens; when it lies longer, the Mildew follows; this is the Course of the Accident.

There are Nights in which there is very little

the Dew; and, in this Case, as the thick Juice will remain on the Leaves, there is the Foundation laid for the Disorder: but there are yet many Chances for the Crop's escaping. If a Shower of Rain falls the next Day, it will wash away all, and there can be no Mischief to the Plants: if this do not happen, there is the Chance of another Night of Dew, and this will still take Place. Even a third Night's Help from Dew, after two dry ones, will answer the Purpose if there be a brisk Wind in the Morning; but if otherwise there commonly comes on the Damage.

A Wind at any Time, whether after Rain or after Dew, is of the greatest Service against this Disorder; and it is for this Reason Corn, in open Fields, escapes this Danger more than in Enclosures.

Every Article of Improvement has its Disadvantages, which must be guarded against, otherwise they may counterbalance the Benefit. Thus in the present Instance, the enclosing Land, and enriching it with Manure, both make the Crop the more liable to this Accident of Mildew, but they defend it from many others, and encrease the Product sevenfold. Therefore the Business of the Husbandman is to guard against the Damage attending these Improvements, while he reaps their Benefit.

He will now understand perfectly the two fundamental Points, 1. What is the Cause of Mildew; and 2. What are the Accidents that bring it on. He will therefore have a rational Foundation for his Practice in guarding against the Disorder, and in endeavouring to remedy it when it shall fall upon his Crops in spite of all his Caution.

C H A P. XXVI.

Of the Prevention of Mildew.

WHEN the Husbandman's Land is rich, and his Crop strong, let him be upon his Guard to perceive this Accident if it happen, that it may not be gone too far before he attempt a Remedy.

Let him provide against it by making his Enclosures larger for Corn Land than for Pasture; and by leaving Openings at certain Distances, at the Height of about five Foot.

This is a new Practice we are sensible, but it is of the greatest Importance. It may prevent half the Mischiefs that happen to Crops in enclosed Ground.

We have shewn, in speaking of Blights, the great Necessity there is of the Air having a free Passage among Plants of every Kind; and this is always more or less obstructed by Enclosures. The Winds that hurt a young Crop come in only from certain Quarters, these therefore may be defended thicker than the others; and this high Opening in other Places will give all the Advantage of Winds without their Damage.

When this is done there will be much less Danger of Mildew than on other Occasions, but as it will happen sometimes in open Fields as well as Enclosures, 'tis plain this can be no absolute Remedy.

When the Days are hot, and there is little Wind, and the Nights are without Dew, then the Farmer is to watch for Fear of being surprised by Mildews. On examining he will find when the Mischief begins, and he will perceive this thick Juice sticking to the Stalks, Leaves, and young Ears of his Corn. It will discolour them, and he will find it first by his Eye from that Circumstance, and then by the Touch, for it will stick to his Fingers. The Consequence of this is, that the Crop withers; the Vessels that should take in Moisture from the Air, as well as throw out the abundant Juices of the Plant, are stop'd up, and the proper Course of Nature is obstructed. We have explained in a preceding Chapter, in what Manner Trees and Plants are kept in a healthful State, and this free Passage of their Leaves, and the rest of their Surface, is a vast Article in their Oeconomy. The Top of the Corn Plant usually suffers most by Mildew, and if it remain any Time, though it should afterwards go off, yet the Corn in the Ear never ripens kindly, but is lean and poor, and however the useless Part of the Plant thrives, the Ear will be light.

It is of Consequence to the Farmer to know when this Accident happens, for this Reason; because whatever Remedy is in his Power must be applied in Time, otherwise the Mischief will remain even after the apparent Cause is removed.

With Respect to the other Means of Prevention they are few, and not very certain of Success; however, as they can be attended with no Damage, it will be right to try them.

The Fields being known where Mildews are most likely to happen, there must be Caution used accordingly.

As Wheat is more subject to Mildew in these Places, than other Kinds of Grain, and as it is known that the Freshness of Manure makes it the more liable to the Accident, no small Enclosure that has been newly dung'd, should be sown with Wheat; but it should in these Places follow some other Crop, as we have shewn various Methods of managing it in that Respect.

Of all the Kinds of Wheat, that which is called bearded Wheat is least liable to Mildew; this Kind should be sown preferably to any other, in Places where the Mildew is likely to happen. The Reason of bearded Wheat escaping better than other Kinds is, that its Juices are thinner, though they be equally rich; so that when they are drawn forth by the Sun, they do not hang upon the Plant in that clammy Manner.

This Incident in Nature shews the Method of attempting to prevent the same Accident by Art, by thinning the Juices of the Plant. Manures take various Effects, and the two contrary are Dung and Soot. Experiments shew, that the Juices of Plants enriched by Dung are the thickest of all others; and that the Juices of those enriched by Soot are the thinnest, although the Encrease in Grain be as great from one Manure as from the other. For this Reason let the Farmer manure with Soot, where he has Reason to fear the Mildew; and he may by that Means prevent it.

Those Reasons have always most Weight which are

are supported by Experience, and we have its Authority in this Case.

HERTFORDSHIRE is the County where most Soot is used as a Manure, and I speak from Experience, that no County is in general so free from this Accident.

Finally, the Farmer will find by examining from Year to Year, his own Crop, that the Wheat which is sown latest is most subject to Mildew; and that which is sown early very seldom suffers by this Accident.

This is a very important Consideration; and he will find it the most essential of all Means for Prevention of this Disorder. Every Advantage is on the Side of early sowing of Wheat, and this among the Principal of them. Mildews come usually at a certain Time of the Summer; and the Corn that is tenderest at that Time, is most subject to be damaged by them; when it has got a certain Degree of Strength, this Accident will not be able to take much Effect upon it.

A good Husbandman, when he sees what will in every Respect most favour his Crops, especially this of Wheat, which is the richest of them all, will provide accordingly, that he may take the Advantage; and of all the Times in the Year he will find the Month of AUGUST to be the best for this sowing.

The Farmers who have been taught to believe Mildews came from the Clouds, have been led into a weak Neglect of preparing against them: our Reader, who sees what they are, and how caused, will find on the other Hand that so much may be done to prevent this Mischief, that upon providing in Time for the taking every Precaution, he will be under almost a moral Certainty of their escaping.

If he will give his Enclosures Air Passages, sow his Wheat in them at an early Season, and that after another Crop, not upon Dung, and with the Advantage of Soot Dressing, he will need to have very little Fear of this terrible Accident. It may happen at any Time, and under any Circumstances, for there is no guarding against the Extream of some Seasons; but he will nine Times in ten escape by this Practice; and see his own Fields healthful, while his Neighbours are worth little. We shall, in the succeeding Chapter, shew what is to be done by Way of Remedy when the Accident happens: but 'tis much better to prevent such Accidents as these, than to remedy them, and happily for the Farmer it is much easier.

C H A P. XXV.

Of the Remedies of Mildew.

WHEN the Crop has, by a Neglect of any of the needful Cautions laid down in the preceding Chapter, fallen under the Misfortune of a Mildew, the Farmer is not to give it up at once, as entirely lost, but to endeavour every thing for remedying the Disorder. He could not go about this without the Knowledge we have given him of its Nature, but if he consider this, and observe the Relief he sometimes obtains from Nature, he will be led into a right Path for the helping himself. Art, on most Oc-

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casions, does best when it most imitates Nature; but in these Cases there is no Way else by which it can be serviceable.

The Mildew is a thick clammy Moisture, which remaining upon Plants stops their Pores, and obstructs their Growth, and the ripening of their Seeds. Nature washes it off by Rains, and blows it away when dissolved in Dew by Rains.

If Rain and Wind come soon after the Accident, the Farmer therefore knows he has nothing to fear; but a few Days if they do not will be of vast Prejudice to him, therefore this is the Time he is to seize for the doing himself Service.

If a little Rain fall gently, and without any Wind, let him go into his Field and see whether it have done the Business: let him examine the Corn by his Sight and Touch, and he will soon find whether the Remedy sent by Nature has been or will be effectual. If he find the clammy Liquor washed away he may sit down in Peace; but if it remain upon the Corn he may expect Damage, and must prepare to assist in the Remedy.

I have seen when a soft Rain coming immediately after a Mildew has been of the greatest Disadvantage, instead of any Benefit. The Mildew itself has only lodged upon the Tops of some Plants, and on the Stalks and Leaves of others in small Parcels, staining them and corrupting them more or less in those particular Spots. But when such a drizzling Rain has fallen, it has dissolved the thick Juice which caused the Mildew, without being able to carry it off. In this Manner it has spread it in a Kind of Glazing over the greatest Part of the Plant, whereas naturally it would have only affected a few Places. This is the worst Sort of Mildew that can happen; and in this Case, when Nature has taken the first Step, but is not able to perform the whole Cure, Art is to be called in to her Assistance.

In this Situation, which the Farmer will easily know from the Account here given of it, let him send a couple, or according to the Size of the Field, more stout and careful Fellows in: let each of these cut a long, pliant, and well tufted Ash Bough, and leave all the Branches, Shoots, and Leaves upon them, except a few that may be cut off, just for the Convenience of handling them.

Let these Men thus prepared go into the Furrows, dividing Piece by Piece the whole Field between them, and let them sweep off the Wet and Mildew together, with soft Strokes of their Ash Boughs.

These, with their Leaves, will make a Kind of soft and full bodied Brushes, which will sweep off all without breaking a single Stalk. The Strokes are to be made first very gently down, and then with a gentle slanting upwards, carrying on the Boughs a Yard or two before they are brought above the Tops of the Plants. This is a secure and perfect Method of getting rid of the Mildew when some Rain has fallen, and there is no Wind to assist. It does the Business much more perfectly: it is a Way of washing and wiping every Stem; and is in this Manner done with very little Trouble.

When a Mildew is seen upon the Crop, and there comes no Rain to wash it away, the first

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Consideration is, whether there be a good favourable Dew. In this Case the same Assistance may be given by Art, as in the other; and the Damage altogether prevented. The Dew will hang in large Drops; and is more easily got off than the Rain; and it melts the Mildew as effectually. If it remain till the Sun evaporate it, then the Mildew is left behind; for Heat draws up only Water; but if it be carried off any way before the Sun's Heat take this Effect, the thick Juice, causing the Mildew, is carried away with it, and all Damage is prevented.

A brisk Wind, blowing early in the Morning, will effect this; but, if there be none, some such Course must be used as in the former Case: but as the Dew hangs in larger Drops than the Rain, it will be easier dislodged, and therefore a shorter Method may be taken than the brushing it off by Ash-Boughs. To this Purpose, a Couple of Men must be sent into the Field an Hour before Sun-Rise, with a long Cord; they must walk in the Furrows at the Distance of the Length of the Cord; and one holding one End; and the other the other, they are thus to draw it over the Crop: this will lay so much hold, as to shake off all the Dew-drops; and the clammy Juice, which causes the Mildew, will go with them.

This is a short, easy, and expeditious Method, and it rarely fails of Success; no Injury whatever is done to the Corn, and the clammy Juice, thus rubbed off and scattered on the Ground, dissolved as it is in the Dew, serves as a kind of Manure; for nothing is richer than it, and the Whole gets to the Root.

In these Cases, we see the Boughs or the Cord serve in the Place of Winds, to shake off the Water in which the mischievous Matter is lodged. But we have observed that, as in some Instances, there may want Wind, while there is enough Water, so, in others, there may want both. There may be no Showers, and the Nights may yield no Dew: this is a Condition nearly desperate to the Husbandman: no brushing or shaking will dislodge the clammy Moisture, when it is not dissolved first; and even the strongest Winds would, in this Case, answer no Purpose.

As the Office of a Wind may be performed by Art, as we have shewn, so that of Rain and Dew might, if there were Conveniences; but they are commonly wanting on such Occasions.

If the Crop be of small Extent, and there happen to be a Pond or Spring of Water near, the Owner may sprinkle over the Whole with an Engine, with a Fan full of small Holes at its Top; and, after this, the Boughs or the Cord, according to the Exigence of the Case, will answer the Purpose. Thus the Mildew may be diluted and cleared off, by Means altogether artificial: but there seldom are Opportunities of doing it: indeed, never in the full Extent in very large Concerns. However, by this the Husbandman sees the Compass of what he can do; or what he can attempt, and he may suit his Operations to the Occasions.

The Crops of Corn are not the only ones which may require the Husbandman's Care in this Particular; many other Growths are as frequently affected by it; indeed, all Kinds are more

or less liable to it, and he is therefore to watch in every Instance, and use this Precaution for every Particular; which, in many other Kinds, will come more easily into Use than in this.

We have recommended to him the planting of Hops, and promised him very great Advantages from that Crop; but Hops are no more exempt from Mildew than other Growths: frequently they are damaged; and sometimes they are altogether destroyed by this Accident.

There is no Crop needs more careful Watching on this Account. We have laid down the Methods of examining whether it be coming on; and, according to the early Notice of the Mischief, obtained by these Means, will be the Prospect of Success in the Remedy.

As soon as the least Appearance of it is perceived, let the Plants be watched; and, after a Shower, if any falls, or, if not, early in the Morning, while they are wet with Dew, let them be well shook, Poles and all; if this do not prove sufficient, let them be brushed with the Ash-Boughs, taking Care not to hurt them, for it will be easy with these leafy Brushes to wipe over every Part, and not bruise or break any.

When there is Rain or Dew, this Method will be sure of Success in the mildewed Hop-Ground; and when there is neither, the Engine must be called in to sprinkle the Plants.

This may be done very conveniently and easily in a Hop-Ground, tho' it can scarce be performed at all in a Corn-Field of any Extent; and it will be very well worth the Labour, because it will answer a double Purpose: it will at once clean the Plants, and water the Ground. This is always useful, in the highest Degree, to Hops, when the Season is dry toward the Time of their growing to Ripeness: and frequently it will happen, that the Produce shall be greater after this, than if no such Accident had happened.

C H A P. XXVII.

Of Smuttiness of Corn.

WE have shewn that dry Summers are the most subject to Mildew; and, on the contrary, Corn is most apt to be smutty in such as are cold and wet. Indeed, this seems one principal Cause of the Accident.

When Wheat is smutty, the Grains, instead of containing a fine white Flour, are full of a black Powder of a disagreeable Taste and offensive Smell.

This is a very unfortunate Accident, because it debases the Value of the Grain more than any Thing, and is apt to continue when it has once got footing. Sometimes it thus altogether alters the Colour and Quality of the fine Flour of the Corn, sometimes it only affects it in Part; but the least Article of this Damage is very much to be dreaded.

Nothing is more essential to the Husbandman than to know the Causes of those Accidents which his Interest is so deeply concerned to remedy; nor is any Thing more difficult for him to attain: for in this, as in other Articles of a like Kind, those who should inform are too apt to mislead him.

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We have shewn him how, in the Articles of Blights and Mildews, those Insects, which came to feed upon the accidental Flowing of the Juices from the Disorder, are supposed to be the Cause of it: and the Case is exactly the same here.

Mr. BRADLEY accuses the East Wind of bringing Insects, which occasion this Damage, by eating up the proper Juices of the Corn, and mixing their own with it: and long after Mr. TURBERVILLE NEEDHAM shewed the Royal Society, that in all smutty Corn there are such Animals.

It is certain, that wherever there is a Corruption, either of Animal or Vegetable Substances, these Insects are to be found: but the Farmer is to be told, these Writers take the Effect for the Cause. The Maggots hatched from the Eggs of Flies in putrified Meat, are no more the Occasion of that Putrefaction, than the Worms found in smutty Wheat are of the Smut. The decayed State of each Kind affords a proper Nourishment for these little Animals; and wherever there is a Place for them, and Food for their Support, pregnant Nature sends them. Their Eggs fly about innumerable in the Air, and tho' Millions perish, those few which happen to lodge where there is a proper Place, will always live, and they will be enough to propagate their Species, and to continue the Mischief.

It is of the utmost Consequence to inform the Farmer of Errors into which he might be led, respecting the Cause of these Accidents which affect his Crops, for a Mistake in that fundamental Article, leads him into an Error in his whole Practice.

If he supposed, according to those Writers, that Insects were the Occasion of Smuttiness, and that an East Wind brought those Insects, he would think he had nothing to do but to plant out the Annoyance, and defend his Fields against that Quarter.

We can assure him, from Experience, he would not be at all the safer from Smut from this Precaution; and nothing is so prejudicial as depending upon a wrong Method, instead of seeking out the right. Many have perished miserably by eating the Liver of a mad Dog as a Remedy for his Bite, whom the Salt Water would have saved from that terrible Catastrophe. In lesser and in greater Matters the same Caution is to be given against depending upon fallacious Remedies.

Having shewn the Farmer what is not the Cause of Smuttiness in his Wheat, we shall conduct him to a rational Search in order to find what is; for till he knows that he can promise himself little Success in preventing the Accident.

The more Learned among those who have written on Husbandry, are they who say Insects are the Cause of Smuttiness; and those of the plainer Class attribute it to the Soil: but here our enquiring Husbandman will find himself as much perplexed as ever; one saying that it is the Over-rankness of the Land which occasions the Disorder, as MORTIMER; another, that its Poorness is the Cause, as BLAgrave; and some attributing it to both; as those modern Compilers, whom Tenderness even to well intended Dulness, commands us to spare, who have collected without Examination, and wrote down without

Thought, the Words of one Author at the Beginning, and those of another at the End, tho' exactly contradictory; forming, without Remarks, a Whole, from these disagreeing Parts.

As some of the practical Writers attribute the Smuttiness of Corn to the Qualities of the Land; others lay it on the Conduct of the Farmer: some of these tell him, that the laying rotten Vegetables on the Ground, by way of Manure, is the Occasion of Smut in the Wheat, as WORLIDGE; who by that Observation would terrify the Farmer from the Use of a very good, cheap, and harmless Manure: and others inform him, that smutty Seed raises a smutty Crop, and so attribute all to the Choice of the Seed-Corn.

Among this Variety of Sentiments, all adopted by Writers of some Reputation, the Farmer knows not which to chuse or credit: and so unhappily is he circumstanced, that wherever he fixes among them he will chuse wrong. We have shewn him what has been said, that he may avoid paying too much Regard to it; and shall, after this, direct him, by his own Observation, to discover the Cause of the Disorder; after which he will rationally proceed to the finding a Remedy.



CHAP. XXVIII.

Of the real Cause of Smut.

THE enquiring Husbandman will first see, on examining the Nature of smutty Corn, that there is a great deal of Difference in the Disorder, according to the Degree of it. When it is in the full Height of its Mischief, the whole inner Substance of the Corn is black as Ink, of a faint, nauseous Taste, a bad Smell, and of offensive Qualities, occasioning Sickness in those who eat Bread made of Flour in which there was much of it. In this Case, if the Corn be bruised, and steeped in Water, it presently shews innumerable Worms, like little Eels, living in every Part of it.

When the Disorder is not arrived to this full Height, the inner Substance of the Corn is not then entirely hurt, but the Outside is spotted with black; and, in some Corns, a Part of the Flour within. This makes a great Change in the Matter; for the first is wholly destroyed, whereas the other may sometimes be recovered for certain Uses, though not for all Services.

When our Husbandman understands this Difference in the Degree of the Disorder, let him first recollect what his Memory will recall to him, as to the Circumstances of former Years, and then examine the present: this Way and this only will lead him to the Truth.

He will remember that there have been certain Seasons when a great deal of Corn was smutted; and others, where very little suffered that Accident. Let him call to Mind the particular Circumstances, and he will find that all those Years, when there has been so much of the smutty Corn, were cold and wet; and that those which shewed least of this Accident, have been the hot and dry.

This first Principle then will be established in Reason, upon the Testimony of Experience, that
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a cold wet Summer is one principal Cause of Smuttiness in Corn: and this will be of great Use, as it will assist in explaining to him the particular Causes; and warn him when he is most rationally to expect the Damage, and therefore when he is to guard against it.

ENGLAND is more subject to this Disorder of Corn than any other Country we know; and this is owing to the same Cause, our frequent wet Summers: in the warm and naturally dry Countries it is not known at all, or not in a Degree worth Notice.

In EGYPT no Age ever saw a black Grain of any Corn; for in EGYPT they have no Rain: and even in ITALY it is little regarded now; and was so slighted in earlier Time, that all the ROMAN Writers have not a Name for it. There is not a Word for Smut in the LATIN Language. The Reader, must not censure this Assertion, if some modern Writers, in that Language, have attempted to name it: they use Words which properly express Blight and Mildew: to both these the old ROMAN Fields were subject, therefore they have Terms to express them; but this was little known, and less regarded.

When our Farmer has led himself into a just Knowledge of the Cause of Smut, let him add Observation to the Information of his Memory.

In a wet Summer, let him examine his own Crops, and those of his Neighbours, and observe whose Corn is infected with this Malady, and in what Degree.

We have made the Observation so strictly before him, that we can inform him what will be the Result of his Enquiry. He will find a great deal of Corn infected with the Accident in these Summers; and that most which is upon the poorest Land, and the wettest. These are the two Things that concur with an unfavourable Summer, to occasion Smut, and he need look no farther for the real Cause.

He will perceive that in most Grounds there will be some smutty Ears, such a Season; but in the poorest and wettest, most; in proper and well managed Land he will see but few, and those smutted, in general, but imperfectly; a very small Part of them will have the Disorder in its full Force, having the Corn converted to a black Dust, the rest will only be here and there spotted on the Surface. Next let him examine a poor Land, not particularly wet, and he will see most of the Corn there specked and spotted, tho' but a small Part is absolutely rotted with the Smut; but in a Field that is poor and wet both, he will find the greatest Part perfectly smutty.

This will be the natural Result of the Soils and Season; and from this he will form a Judgment of what Smut is, very different from what he has read; such is the Difference between reading, in general, and seeing; and he will no longer attribute the Disorder to Insects or East Winds, but see it as a natural Effect of an unfavourable Season upon an unkindly Soil: he will see cold and wet Summers the principal Occasion; and he will find also that they take most Effect where the Husbandman has been least regardful of his Duty: and he will thus be led to a proper Conduct.

He will perceive in the same Kind of Soils a great Difference in the Degree of the Disorder; and this will lead him to examine into the Occasion; which he will find to be the better Management in the Article of sowing; and the Change or the Preparation of the Seed: these are Articles we are to enquire into in a succeeding Chapter; 'tis enough that we have here led him to find by his own Remembrance and Observation, what is the true Cause of Smut, and settled him in a right Notion with Respect to so much of his Conduct.

He will now know, that neither the Richness of the Land in general, nor any Kind of Manure in particular, are the Cause of Smuttiness in Corn, though both these have been asserted; and he might have been misled by such Accounts. He will therefore not be afraid to enrich his Land in general, nor to use any Kind of Manure in particular; but will know, that the Season is the great Cause of the Malady; and that it takes most Effect on the poorest and the wettest Grounds: therefore he will bend his Mind to the draining and enriching those Lands he suspects most as being liable to Smut; and will consider that every thing which impoverishes his Land is a Cause of this Distemperature; and every thing that puts it in Heart, is a Defence against it.

CHAP. XXIX.

Of the preventing of Smuttiness by a due Care of the Land.

WE are now acquainted with the Cause of this Accident; and therefore are in a rational Way of guarding against it. In order to this every Thing is to be done that can give Strength to the Crop. The two Things that make Land afford abundant Nourishment are Tillage and Manure; and of these great Tillage is the best for the preventing this Disorder.

We speak here from Experience; we have seen Lands, where no Care about the Seed and other Articles could prevent frequent smutty Crops, which have yet been cured by repeated Plowings.

As Smut may arise from these several Causes, a too abundant Moisture, a Poorness of the Land, and an ill Conduct in the sowing, let them be severally guarded against by the careful Husbandman, and he will have the farther Encouragement to be careful in this Respect; that every thing he is to do to prevent Smut, will also enrich and improve his Land. He will by this rational Conduct not only secure to himself a cleaner, but a larger Crop.

In the first Place, if his Land be poor let him use the several Methods we have before related for the Improvement of it; and if it be liable to Wet let him lay it high, and cut the Furrows deep and in proper Direction. This we have explained at large already, so that it needs only be named here. 'Tis enough that we tell him it is to be done; we have elsewhere shewn him how to do it.

As a great deal of Tillage is the best Way of

enriching Land to prevent Smut, it follows that the Horse-hoeing Husbandry is particularly calculated to prevent this Damage; and what is thus pointed out by Reason is also confirmed by Experience; for upon repeated Examination we have found, that Land managed in this Method is not nearly so subject to smutty Crops, as that in the common Course of Husbandry.

But as we no where recommend Tillage alone, but on every Occasion would have the Improvement of Land owing partly to this, and partly to Manure, it is needful here to speak of the Kind of Dressings that are most proper. We have directed the Farmer already to adapt his Manures to his Soils in a general Way; and that is a Point he must always keep in his Memory: but as this does not tie him down to any one particular Dressing for any one Soil, he has still a Choice, which, though it does not go through the whole Range of these Materials, yet is enough to be very serviceable to him on the present Occasion.

As he sees that Dampness has a very great Share in the occasioning of Smut, he should chuse the dry and warm rather than the fat and moist Manures: thus fresh Dung is one of the worst Dressings for a Piece of Land inclined to smut the Corn; and of all that can be chosen, Lime is the most proper.

We have named the two Extrems; the Farmer will know there is a great Variety of Articles between them: let him take any of these according to the Nature of his Land, and the other Circumstances.

In this Point Experience confirms, as in the others the Dictates of Reason. Upon an Enquiry among the most experienced Farmers in different Counties, we find that there is no Part of the Kingdom so free from Smut as DERBYSHIRE, where they use a vast deal of Lime; and in general, that the Places where it is most common, are those in the Neighbourhood of great Towns, where there is Abundance of Dung used in the Dressings.

Thus far we have considered the Article of preventing Smut, by a due Care of the Ground; the Result of which is, that the Farmer who knows where the Danger lies will best guard against it, by keeping his Land in good Heart by warm Manures and frequent Tillage, and by laying it in such a Manner that it may have the most Advantage possible of the Sun, and the least Damage from Wet; according to the Rules we have laid down in their Place upon those different Heads.

C II A P. XXX.

Of the Prevention of Smut by the Conduct in Sowing.

WHEN the Farmer has prepared his Land for the Reception of his Seed Corn, so as to have it the least likely to be damaged by Smut, he is to consider what will tend to make the Crop liable to it, and what will be most likely to defend it against that Accident in the Article of sowing. The Crops which are

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most subject to it, are such as are starved, and such as are chilled: against the chilling of them we have said all that can be needful in the preceding Chapter; and the Directions we have given about the Use of right Manures and frequent Tillage, will tend greatly to the preventing their being starved; but the Farmer will recollect that there is another Article which always tends to the impoverishing a Crop, which is the sowing the same Seed again and again upon the same Ground.

Whatever tends to the impoverishing the Crop, always tends in the same Degree to the subjecting it to Smut. This is a plain Result of what we have shewn before, that the Poor-ness of the Growth, from whatever Cause it arises, is one of the two great Sources of Smut.

The Change of Seed Wheat is very easy, because it is every ones Interest; and as the Farmers of different Parts are to be mutual Gainers by it, they will doubtless be ready at all Times to do it: in this we shall only give the general Caution, that the Farmer on both Sides behave with Integrity, sending in his best Corn in the Exchange; for nothing but that can keep up the Credit of this useful Intercourse.

There has been an Opinion, that smutty Grains will grow up into a smutty Ear: but this is an Error; for they will not grow at all. However, they will do just as much Damage in the Ground as if they did: for if many of them be sown among better Corn, they will spread the Infection of their Juices in the Land, and produce the same Effect as if they could grow themselves; or indeed worse, because they will infect farther.

In the Case of sowing Wheat, among which some is smutty, the Effect is this: the smutty Grains break and dissolve in the Ground, at the same Time that the others swell and shoot out their first Roots: when these are just taking in their first Nourishment, the rotted Corns of the smutted Kind afford their Juices to them: they take in this, and it gives a Tendency to Smuttiness in the whole.

The Farmer thus sees a very plain Reason against sowing Corn that has any smutty Grains among it; it is indeed worse upon this true Principle, than upon that false and foolish one others have assumed, of those Grains growing.

This will stand as a Caution to the Husbandman, that when he sends Corn in Exchange, he does not for his Credit Sake send such as has any Smut among it; and that when he receives Seed Corn in Exchange from another, he look it carefully over, before he prepare it farther for sowing.

A clean Seed is so necessary on this Occasion, that he should not suffer a Grain to be sowed that has the least Speck upon it; nor any that has been washed or otherwise cleaned; for it is not certain, nor indeed probable, that any cleaning of Grain once smutted, can make it fit for this Purpose.

This Caution being established in the Examination and picking of the Seed Corn, the Advantage will be very great in the receiving it from another Part of the Country. Nothing

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There has been an Opinion, that smutty Grains will grow up into a smutty Ear: but this is an Error; for they will not grow at all. However, they will do just as much Damage in the Ground as if they did: for if many of them be sown among better Corn, they will spread the Infection of their Juices in the Land, and produce the same Effect as if they could grow themselves; or indeed worse, because they will infect farther.

In the Case of sowing Wheat, among which some is smutty, the Effect is this: the smutty Grains break and dissolve in the Ground, at the same Time that the others swell and shoot out their first Roots: when these are just taking in their first Nourishment, the rotted Corns of the smutted Kind afford their Juices to them: they take in this, and it gives a Tendency to Smuttiness in the whole.

The Farmer thus sees a very plain Reason against sowing Corn that has any smutty Grains among it; it is indeed worse upon this true Principle, than upon that false and foolish one others have assumed, of those Grains growing.

This will stand as a Caution to the Husbandman, that when he sends Corn in Exchange, he does not for his Credit Sake send such as has any Smut among it; and that when he receives Seed Corn in Exchange from another, he look it carefully over, before he prepare it farther for sowing.

A clean Seed is so necessary on this Occasion, that he should not suffer a Grain to be sowed that has the least Speck upon it; nor any that has been washed or otherwise cleaned; for it is not certain, nor indeed probable, that any cleaning of Grain once smutted, can make it fit for this Purpose.

This Caution being established in the Examination and picking of the Seed Corn, the Advantage will be very great in the receiving it from another Part of the Country. Nothing

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can prevent a Piece of poor wet Ground sown with smutted Corn from being smutty; but in the common Course of Things, a Crop that would have been liable to this Accident from any apparent Cause, will be much more likely to escape, if the Seed have been chang'd. This always makes the Growth, under equal Circumstances, more vigorous; and we have shewn that the heartier it is, the more safe it always is from this Accident.

WORLDGE, and other of the earlier Writers, with one Voice recommend this Change of Seed for the Prevention of Smut; and Mr. TULL proposes it as the great and certain Remedy.

We shall not misinform the Farmer so far as to join Mr. TULL in calling it a certain Remedy; for upon a long Examination of this Matter we have found, that though very useful with other Precautions, it will not do alone. This is the worst Error a Farmer can commit: in depending so far even upon a good Article as to omit all others: he is trusting to one Assistance where he may have many.

It is certain the Change of Seed is a very good and highly useful Method; but these several other Precautions we have named have a Right to the same Regard. Mr. TULL supports his Assertion by the Experience of a Gentleman, who changing his Seed with one who also chang'd his own every Year, in ten successive Years, though several of them were wet ones, never had one smutty Ear in his Crop, though he used no other Precautions. He adds, that in some of those Years, those who used every other Method of Prevention had a great deal of smutty Wheat, while he escaped. This would tend to lead the Farmer to depend upon the Change alone; but Mr. TULL, though a very honest Man, is a very warm Writer; and those Authors are to be read with proper Allowances.

The proper Conduct is to adhere strictly to this useful Caution of changing the Seed, without depending upon it alone: and having thus established the general Practice upon Reason, we shall examine into the Particulars.

Every Change of Seed will be of Service, both against Smut, and in Favour of the general Growth; but the Nature of this Exchange being well considered, the Advantage may be doubled. The Soil makes a great deal of Difference in the Condition of the Corn for sowing; and Respect is to be had to it for that Reason.

In general, the Wheat that has grown on a dry sandy Ground should be all sold for eating; for it never succeeds so well as that from other Soils, either upon the same Ground again, or upon any other.

As the sandy is the worst Land for getting Seed Wheat for a Change; so the best is that which is of the most opposite Kind; this is the clayey: and this is not only shewn by Reason, but testified also by Experience.

Upon whatever Land Wheat is to be sowed, there is none so proper to bring it from as a tough, firm Soil, that has a good deal of Clay: it will thrive in a Land of the same Kind, in a Loam, or even in a Sand.

When the Soil is clayey to which the Wheat is to be brought, none is so proper as one of the

same general Nature; but the whole should not be in every Respect alike, because that will be like sowing the same Corn upon the same Land, and will abate, if not destroy the Advantages of the Exchange. The Colours of clayey Soils usually shew their Differences: and by them we may judge on this Occasion.

A white Clay is the best Soil to take Seed from that is to be sowed on a red; and a black Clay furnishes the best Wheat for a yellow: in the same Manner, interchangeably, the Wheat that has grown on yellow is good for black; and that from red for the white. These, however, are Niceties that need not be observed where there is any Difficulty. In general let the Farmer get his Seed from a sound Soil at a Distance from his own Land; and if he can, let him get it of some one who changes it yearly himself. This, though alone it may be liable to Smut, like other Corn, yet would be less so than others: but a Seed of this Kind sown on Land prepared as we have directed, will be absolutely secure.

In the common Course of Husbandry, the changing of the Crop upon any one Piece of Land, is another needful Caution to prevent Smut. This depends on the same Principle with the Rest: often sowing the same Crop on a Piece of Ground makes it weaker; and where Wheat is weak, any Unfavourableness of Season will make it smutty.

But in the Horse-hoeing Method this Change of the Crop to the Ground is not necessary, tho' a Change of Seed from some other Place is. The Reason is plain, that in this new Method, tho' the same Field be sown with Wheat ten Years successively, the Growth will never be any two Times in the same Place; so that while the Crop is enclosed in the same Hedges, yet it annually grows in a different Parcel of Ground. We can assure the Farmer from Experience, that is sufficient; for if the Seed be changed every Year, though the same Field be thus sown with Wheat ever so long, not an Ear of it will ever be smutty.

Having thus directed the Farmer in the Choice of his Seed, and the ordering of his Ground, for making his Crop free from Smut, we shall in the next Chapter shew him in what Manner he is to order it for the sowing; and shall conclude the present with one certain and practical Observation, that of twenty Crops which are smutty, nineteen, if not all, are owing to bad Management or Carelessness in one Article or other of the Preparation.



C H A P. XXXI.

Of preparing the Seed against a smutty Crop.

THE Practice of steeping Seed Corn, which has of late been so greatly recommended, and is become so universal, is in no Article more serviceable, than in preventing of Smut. When the former Precautions have been taken for the procuring the right Seed, and dressing the Land in a proper Manner, if this be added there is little Fear of Success. In general, the earlier Wheat

Wheat is sowed, and the better it is steeped before sowing, the less it is liable to be smutty. The Reason will be obvious to the Reader, who considers what we have said of the principal Cause of Smut, which, next to the Badness of the Season, is the Weakness or Poorness of the Crop: now early sowing naturally makes the Growth strong, at a Time when others who have sown late have it much weaker, because Time never fails to give it this Strength: and the Advantage of steeping is just of the same Kind; for it makes the Crops more vigorous. Let any one look into the several Fields in a wet, cold Summer, that has smutted a great deal of the Wheat, and he will be sure to find the poorest in other equal Circumstances has suffered most.

Of the various Methods that have been proposed for brining of Seed Wheat, there is no Need to use any on this Occasion, but the plainest and most familiar. Receipts are published abundantly, in which Copperas, and Alum, and Urine, and the like offensive Ingredients are recommended; but this is the Act of Fancy, not of Judgment. Most think they shew the more Skill, the more Ingredients they can crowd into their steeping Liquor; as those old Physicians, who in the Composition of Mithridate and Venice Treacle, seem not to have considered what would be best for the Purposes of the Composition, but how many Things they could get into the Prescription.

We would have our Farmer understand the Meaning and Design of every Thing he does, and he will then find all this Parade is Quackery, the Jargon of a Stage Doctor to conceal Ignorance. Those who do not know which Ingredients used in the several Receipts for steeping Liquors are best, may put in all, that they may be sure to have the right among them: but the intelligent Farmer should know the Intent of each, that he may be able to chuse with Wisdom on any particular Occasion.

In the present Case, all that he expects from the Brine or Steeping Liquor, is to give the Plants a speedy and firm Growth; let him therefore reject all those Ingredients, which have been, as we have shewn before, introduced for other Purposes; and let him in the present Case use those which tend to promote the Growth only. These are only two, Salt and Lime, and therefore all others are to be rejected.

For this Purpose therefore, neglecting all those Receipts which are crowded with useless, and much more those which are loaded with offensive Ingredients, let him manage in the following plain and easy Manner: first let him pour the Seed Wheat into a large Tub, and pump a good Quantity of Water upon it: let him stir it well about with a Stick; and then leaving it to settle pour off the Water, and pour away all the light Grains that swim upon the Top with it.

Then let him pump more Water upon it, and stir it about; and repeat the same till it has been washed four Times: by this Means the Wheat will be well damped and perfectly clean, and every light Grain will be separated from it.

When the Wheat is thus ready for steeping, prepare the Brine in the following Manner. Pump a sufficient Quantity of Water into a

Tub that has a Tap to it, and put in as much Salt, weighing what is put in, as will, when dissolved, make the Brine so strong that an Egg will swim upon it. This is just half the Strength that is required; therefore let as much more Salt by Weight be put in, and let all be well stirred about till it melts.

When the Salt is all melted put in the Wheat and stir it well about. Let it lie two Nights and a Day, that is, put it into the Brine one Evening, and it will be done enough by the Evening but one afterwards. When it is taken out of the Brine, let it be well covered with sifted Lime, and then it is ready for sowing.

This plain and easy Method is found by repeated Experience, more successful than all the perplexed and complicated Brines; and it is the original Way directed by the Accident that occasioned it. The first brined Wheat sown in ENGLAND was the Freight of a Ship, which sunk near the Shore. The Cargo was saved after it had lain sometime under the Salt Water; and being sown it produced better than any other in the Neighbourhood. This opened the Eyes of the Farmers to a very material Improvement. The Lime is the only Addition required to it; and this, which some think only useful as it prepares it for sowing more conveniently, yet is of much more essential Service. Every one knows the Advantage of Lime as a Manure; and there is no Way of using it so beneficially.



C H A P. XXXII.

Of the cleaning of smutty Corn.

THE Farmer sees what he is to do to prevent Smuttyness in his Crop; and we will venture to promise him, that if he follow the Instructions in every Article, he shall have very little Reason to complain from that Source: but we are to consider that he may, before he gets into the Use of this Method of Prevention, have a smutty Crop, and we are not to leave him uninformed of the Methods by which he is to make the best of it.

Those Ears that shew themselves to be utterly rotted, and converted into a black Powder, should be picked out; and when these are separated, the rest may be managed in the following Manner.

Let the whole Quantity be put into a very large Vessel, and Water in abundance poured upon it: let it be very well stirred about in the Water with a new Birch Broom, and this repeated several Times with fresh Waters, till all the Blackness is got off, and the Wheat looks like other Corn, only for the Wetness. Then spread it upon Sheets, or any other cleanly Way, to dry in the Sun, and turn it from time to time till it be dried perfectly; after which it will be fit for Use.

This is by no Means to be used as Seed Wheat, that we have shewn before, for the least Remains of the Smut would endanger the new Crop; but provided the worst of it have been carefully picked out first, there will be no Harm in the using it for Bread, or any other Purpose.

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We have observed that Wheat, where smutted to a great Degree, is unwholesome; and indeed in that Case it should not be eaten; but when the Defect has been moderate, and the worst is picked out, the Remainder may be eaten without Danger.

In some Places they have a Way of soaking their Wheat in Water for several Hours, in order to get off the Blackness, by rubbing it afterwards in the Water; but when Corn is so bad as to require this, it is, honestly speaking, too bad to use.

In this Case, as the Water has penetrated the very Body of the Grain, the Sun and Air will not be enough to dry it. They for that Reason put it to dry in a Kiln, in the Manner of Malt, and afterwards sell it; but this every one should be guarded against, not only with Respect of sowing, but for the common Service, as the Bread of Families.

In Respect of Seed Corn that should be of the choicest and purest Kind of all, so that any Imposition upon the Farmer in the selling for that Purpose, is cruel in the highest Degree. When he is obliged to buy his Seed Corn, he must be very nice in the Examination of it; and he may discover whether any Trick of this Kind, more or less, have been play'd with it, by the Sight and Taste. Fine and perfect Wheat should look shining, and all of a Colour; if it be dim on the Surface, or of different Hues in the several Grains, it is to be suspected. The sweet Taste of good Wheat is also very well known to the Farmer, and no Art can give this to such as has been washed or otherwise managed to hide its Faults.

In FLANDERS they go farther than the late named Practice in the clearing of their Wheat that has been smutted; they have a large hollow Machine, made of Plates of Tin set in a wooden Frame. These Plates are all pierced full of Holes inward, so that the Inside is in all Respects like the rough Face of a Nutmeg-grater. When their Corn is smutty in any great Degree, they first steep and wash it very carefully in Water, and then, when it is somewhat dried, they put it into this Machine and work and shake it about; the Consequence is, that the black Spots are in Part grated off, and in Part concealed; and this, though none can be deceived in it, so far as to buy it for Seed Corn, is sold for Bread, and is often the Occasion of great Disorders.

Our Custom of picking out the worst Ears first, takes away the Necessity of any such Contrivance for the rubbing the Grains down; but in general, when it is so bad as to require this, the Farmer has more Occasion to blame himself than any thing in the Season.

The great Article in order to prevent the Mischief, is the using a proper Kind of Manure, and a due Quantity of it, with a due Degree of Tillage. And we may be led, by further Examination of the several Places where particular Manures are used, to know which agree best and which worst, with the Intention of preventing Smut. A great deal we have done in this Matter, by examining the Crops in such Places as we have had Opportunities to visit; and by

making Enquiry by Letter in others: but it would be of the utmost Service to the Improvement of this useful Study, if those who have Judgment and Experience in the several remote Countries, would communicate their Knowledge for their mutual Benefit. The Proprietors of this Work will be very glad to be instrumental to so general a Good, and as it is now drawing toward a Conclusion, they take this Opportunity of offering their Service, and ours the Compilers of it, to review and prepare for the Publick Service any Papers or Letters which shall be directed to them, containing any Branch of useful Knowledge.

Having thus gone through the Care of the Land, and Management of a Crop under every Circumstance, nothing remains for the completing this Part of our Work, but the informing the Farmer how he may best preserve his Corn when he has reap'd and thrash'd it; and this we shall give in the Words of a Correspondent, to whom we have been often before obliged on the most interesting Occasions, and whose Discoveries and Improvements on this Head demand the Thanks of the Publick, more than the Labours of most other Enquirers.

A DESCRIPTION OF A Ventilating Granary,

For the Preservation of Corn in a State of Rest; with the Plan and Construction of it: Also, some Observations and Directions about sound, and tainted or ill-saved Wheat, with Respect to their Preservation in this Kind of Granary.

Principles upon which this Granary is built.

AIR, consequently Dryness and Coolness, duly administered together, with sufficient Security against Vermin, seem to be the Essentials necessary to the most convenient Methods of preserving Corn, for all its Uses, for several Years together in a Granary or Magazine, without stirring.

N. B. A Granary or Magazine, on these Principles, should not be built in a confined Situation; as, near the Shade or Shelter of Trees or Buildings, but where the opposite East and West Sides of such Granary may be properly exposed to those Points: in which Case most of the intermediate Points between them and the North and South, will act upon this Granary more or less, according to the Velocity of the Wind, by fixing the Folding-Doors thereof properly, at such Times when the Corn is to be ventilated.

REFERENCES to the PLAN.

Plate 1. Elevation of the Granary or Magazine to be built of Brick or Stone, of various Dimensions, according to the Occasions of the Owner; but here (as a Specimen) only 46 Feet long by 17 broad, from Out to Out.

Pl. 2. Section of the Granary Lengthways through the Middle.

B. B. B. B.

B. B. B. B. The Garret, all in one Chamber, into which the Corn may be received by Means of a Crane or Pully fixed over the Door (k) (Plate 1) on the North Gable of the Building; to which Door a Ladder, or Flight of Stairs on the Outside of the said Gable may communicate. This Garret may occasionally be made Use of as a Store Room for Corn, that has already been preserved two or three Years in the Chambers below, marked (C. C. C.) or for other Kinds of dry Goods, leaving a few Air Holes only in the Gable Ends of this Garret Story.

C. C. C. Three Chambers where the Corn is to be first repositied, in order to receive the necessary Ventilations for a Year or two, or more, till perfectly cured or sold; each Chamber here, about 13 Feet square, by 12 high; to be divided from each other by Brick Partitions (m. m.) carried up from the Ground. The Sides of these Chambers to be neatly covered with Stucco Plaster.

G. G. G. The Floors of these Chambers, to be supported with whole double Deals laid Edgewise, and covered with narrow Deal Boards, not exceeding six Inches in Breadth, leaving a Space of near an Inch between each Board, that Room may be given for the Air to ascend equally through these several Interstices in the Floors, in order to ventilate the Corn contained in these Chambers, as Occasion requires. (vid. Plate 3. Fig. 1.) These Floors, or at least the Interstices between the Boards, to be covered with close Wire Grating, that will not admit the Grain to pass through; or the Floors may be covered entirely with a proper thin, but strong Hair Cloth, nailed down round the Confines of the Floors, before the Corn is lodged.

G. G. G. Small Trap Doors (vid. Pl. 3. Fig. 1.) to be made a Foot square each, one in the Center of each Floor; which may be opened occasionally, to let out the Corn into the Ground Chambers for Use or Sale; and may at such Times, if a brisk Wind sets in and through the Ground Chambers, prove a good Winnowing to such Corn to prepare it for Market, especially if the said Trap Doors be humoured by the Hand, so as to let fall the Stream of Corn thin and diffused on the clean Ground Floors. These Trap Doors to be free from Wire Grating or Hair Cloth over their Dimensions; to be affixed by Hinges, so as to open into the Ground Chambers; at other Times kept fastened with a cross Iron Bar Staple and Pad-Lock, to prevent Imbezement. The Ceilings of the Chambers C. C. C. must be made as much Air Proof as may be, either by some excellent close Plaster Ceiling, or only by caulking the Joints in the Garret Floor above, pitching the Seams afterwards, and dashing drift Sand on the Seams after the hot Pitch Brush, by which Means no Air can pass out of the Chambers C. C. C. except through the Flues (L. L. L.).

L. L. L. The Flues, to be made of a Piramidial Figure, with Beams erected at the four Angles of each Flue, well barred and braced together, and covered with Laths and Plaster, so as to be tight and Air-Proof; to be four Feet square each at their Bases, and well fixed in the Garret Floor, and to the Roof Timbers; to be

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erected directly over the Trap Doors (G. G. G.) and elevated twelve or fourteen Feet above the Ridge of the Roof of the Building; their Openings at their Tops to be a Foot square each; a Piece of Brass Net-Grating to be fixed half an Inch within their Muzzles, to prevent Sparrows or other Annoyances descending to the Corn below, and also to admit of a Cover or Valve, falling close on their Muzzles. These Muzzles to be well guarded from Rain and Snow by proper Umbrelloes, elevated a little above them, and well fixed to the Continuation of the four Beams of the Flues. The Valves just mentioned to be made of square Pieces of Oak Board, exceeding the square Dimensions of the Orifices of the Flues, by two Inches on every Side; a Plate of Lead of five or six Pound weight, to be nailed on the Top of each Valve; the Valves underneath to be lined with Buff, well soaked in Pickle, to attract the Moisture of the Air, swell and stop close. These Valves to open or shut by Means of a small Cord, fastened to a very short cross Sling of the like Cord, which cross Sling communicates, and is made fast to four Staples in the four Corners of each Valve; that the Valves may be raised and lowered evenly on their respective Muzzles, by Means of the small Cord passing over a Pully fixed under the Center of the Umbrello, and down between the Lath and Plaster; and the boarded Lining of the Flue comes out to hand in the Garret, through a small Hole in one Side of the Flue, which Hole should be made through a Piece of Wood fixed in the Framing of the Flue; and the upper Edge of the said Hole, on the Inside of the Flue, should be guarded by a small Roller of Wood, to ease the Friction of the Cord upon drawing up the Valve, and keeping it in that Situation by a Weight somewhat superior to that of the Valve itself, hung to the Cord End in the Garret, or the Cord may be made fast to a Hook in the Garret Floor, making Allowance for the lengthening and shortening of the Cord by the Weather, that it may not be in danger of breaking; these Valves or Covers should also be guided in their raising and lowering, by four fixed upright smooth wooden Bars, which may lodge them equally on the Squares of their respective Flue Mouths. These Valves or Covers might be contrived to be opened and shut by other Methods, but this seems to be one of the most simple, and least liable to Disorders and Repairs. The chief Use of these Valves (and a very considerable one) is the keeping out the moist foggy Air from descending upon the Corn, when the Granary is not to be ventilated.

i. i. i. Trap Doors in the Garret Floor, for laying in the Corn into the Chambers C. C. C. to be two Foot and half square each, well fitted to their receiving Jambs, and made tight with Clay well tempered with Salt and Water, after the Chambers are charged with Corn.

D. D. D. The Ground, or lowest Chambers that should be admitted in a Building of this Nature, the Sides of which to be smooth plastered, that Rats or Mice may not be able to ascend to the Corn Floor, nor should any Goods or Lumber be admitted into these Ground Chambers, because they would diminish the Diameter

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of the Quantity of Air to be admitted into them, and consequently of its Weight and Pressure necessary to force its Way up through the Interstices left in the Corn Floors, as before described.

E.E.E. Large folding Doors to each Ground Chamber, opening outwards, which when set open and properly fixed may catch the drying Side Winds, and direct them into their respective Chambers. The like folding Doors to be on each Side of the Building, East and West, opposite to each other, so that upon ventilating the Corn above, the Windward Doors only are to be opened; at all other Times, when moist Weather prevails, all the Doors, as well as the Valves before-mentioned, to be kept shut and close as possible; for which Reason these folding Doors are to be truly fitted to their Jambs, as also to their upright center Posts where they meet, bolt and lock, or by a strong cross Bar and Pad-Lock on their Outside; and the Borders of these Doors, at all their Meetings on the Inside, should have a Lift of Buff nailed round them with Sprigs, in order to prevent an Indraght of moist and foggy Air, as much as possible.

Mice and other gross Vermin, will find great if not insuperable Difficulty, to get Admittance into this Granary; and Insects infesting it, may be destroyed by Brimstone set on Fire occasionally in the Ground Chambers, keeping the folding Doors, as well as the Valves above, close shut at such Times of stoving, and it should be well stoved before it be replenished with Corn.

It is sufficient only to remind many People, that the Acid Fume of Brimstone confined, kills all Insects within its Circulation, and no Doubt discourages their Approach for some Time after; and may probably tend to abate Fermentation in the Grain, which is generally, if not always, occasioned by superabundant Moisture and Heat.

REASONS offered for the Operation and Effects of this VENTILATING GRANARY.

When the dry ponderous Air is directed into the Ground Chambers by their folding Doors, and strongly pressed in by the continued impelling Force of its own Current; being there accumulated, it will endeavour to expand itself, on every Side, by its own elastick Spring: and so passing through the Interstices, before-mentioned, in the Floor above it, as the least resisting Vents will insinuate itself through the Wire Grating or Hair Cloth, into the numerous Interstices between the Grains of Corn; through which its Motion will be greatly expedited by Means of the Flues, above, when open; as the Air at their Tops being above forty Feet from the Ground, will be much rarer than in the Ground Chambers below, where it will be greatly condensed by the Pressure of the superincumbent Atmosphere, and also by the impelling Wind or Current of Air continually driven into the lowest Chambers. The Air therefore, always endeavouring to expand itself in the lowest Chambers, to those Parts where it finds least Pressure and Resistance, will continually tend from the lowest Parts upwards, and so produce an adequate Circulation of Air through the whole Bulk of Corn, whereby it will be ventilated and kept cool, dry, and sweet, though in a State of Rest, for several Years together, and

longer than the private Owner should lie out of his Money.

Farther Observations on the Usefulness of this Kind of Granary.

In this Kind of Granary, Wheat may be lodged in Bulk ten or twelve Feet square every Way, or whatever the square Contents of the Corn Chambers be, the Wheat may lie therein within a Foot, or half a Foot of the Ceiling, but half a Foot is a good Distance at first laying in the Corn, for it will soon sink lower as it dries. This is a vast Advantage in Stowage over the old Granaries, where they dare not lay the Wheat, for a long Time after laying it in, above eighteen or twenty-four Inches deep, and that too, frequently turned and aired by Hand-Labour and Expence, for Fear of its heating, musting, and breeding the Wevil; whereas this Kind of Granary, ventilated as it were, per se, and in a Manner without any Trouble or Expence attending it, will preserve at least five Times the Quantity of Wheat upon every Foot of its Flooring, more than the old-fashioned Granaries can do.

N. B. The Ground Chambers need not be above seven Feet high, under the Floor Timbers; and a Brick Floor, or one of Clay, Lime, and Smiths Dust well tempered together, is fittest for the Ground Floor.

In large Military or Publick Magazines, greater Bulks of Corn may be supported by upright Props under the Floors, and the Ventilation proportioned by adding more Flues to each Corn Chamber, and proportioning the Dimension of the folding Doors thereto, or the Number of them.

The Author having never seen or heard of any Granary of this Kind in Practice, submits it to publick Scrutiny, Censure, or Improvement.

The Distinction and Difference between sound and tainted or damaged Wheat, and their different Treatments in Order to their Preservation in this Kind of Granary.

If Wheat be dry and well saved at Harvest, free from black, blighted, or sooty Ears, has afterwards had its due Sweat and Melioration in Rick, Cock, or Barn, for five or six Months, and after threshing out has been well cleaned and screened; such Wheat may truly be called sound, and when lodged in this Kind of Granary, may be easily preserved therein for many Years, by ordinary and moderate Ventilations.

For Instance, being thrashed out in JANUARY or FEBRUARY after reaping, well cleaned, and lodged in this Granary; it may be ventilated once a Week, if Opportunity offers, for the first two or three Months in Spring, which will be a great Advantage to the Grain, before the sultry Heats of Summer come on, when it should be ventilated as often as a proper Breeze or Gale of Wind offers, and once a Month, a few Matches of Brimstone set on Fire in the Ground Chambers, as before directed; in the Autumn, the Winter, and Spring following, two or three Times a Month may be sufficient to ventilate, without applying the Brimstone Fumes; but the second Summer ventilate twice or thrice a Month, and apply

apply the Fumes once or twice during this second Summer; after which Time it may be sufficient to ventilate once a Month during the second Autumn, Winter, and Spring; and twice a Month during the third Summer, when it may be said to be thoroughly cured.

It may not be amiss, during the first Year or two after the Wheat is lodged in this Granary, to inspect the Condition of the Corn, by opening the Trap Doors in the Garret Floor; especially in Summer Time once or twice; for as Moisture or Vapour of the Corn will always rise to the Surface of the Bulk, though the Center may be dry, so the Appearance of the Surface, as to Moisture or Dryness, may regulate the Number of Ventilations necessary for its Preservation.

It is certain from Experience, that sound Corn that has been well preserved in common Granaries, by frequent Turnings and Winnowings, and afterwards laid two or three Foot deep, or more, seldom sweats, gives, or ferments after the first two Years, except it receive accidental Wet or Moisture, from which it is easily freed with a little Care; whereas it is a long Time parting with its natural internal Moisture, which is the greatest Enemy to its Preservation.

It is no less certain that Wheat, being well preserved by any Method whatsoever, has, after several Years so kept, been found to produce more and better Flour for Bread, than some of the same Field and Crop did soon after its being threshed out; because the aqueous Humidity of the Grain evaporating by keeping some Years, the Flour comes cleaner from its thin Bran under the Stone.

It is equally certain, that Wheat so preserved for several Years, has proved very good Seed Corn, and probably not so liable to produce the smutty Ear; Excess of Moisture, either in the

Seed, the Soil, or the Seasons, being the chief Cause of that grievous Complaint, except the Seed itself be smutty, and then the Crop also will be smutty notwithstanding dry Seasons.

But if Wheat has been ill-saved at Harvest, or be in a contrary Condition, in any or all Respects, to the sound Wheat described above, which would certainly give it a strong Tendency to Heat and Fermentation, in a Bulk of ten or twelve Feet deep, and so induce the Weevil, and other Maladies, to the further Damage or Destruction of the Wheat. It will therefore, in this Case, be necessary first to cleanse well by Screen or Tryer, after which give it a very gentle and slow drying upon a Kiln, equal only to a strong Sun Heat, till the Grain be somewhat hard under the Teeth; then laying it on a Floor to cool, for some Hours, put it into Sacks half filled and tied fast, and so rub the Wheat well therein on a smooth Floor with both Hands, frequently turning the Sacks over every Way, in order to loosen and free the Grain from its black sooty Dust; then winnow clean, after which it may be laid into this Granary ten or twelve Feet deep, and there treated in every Respect like Wheat originally sound.

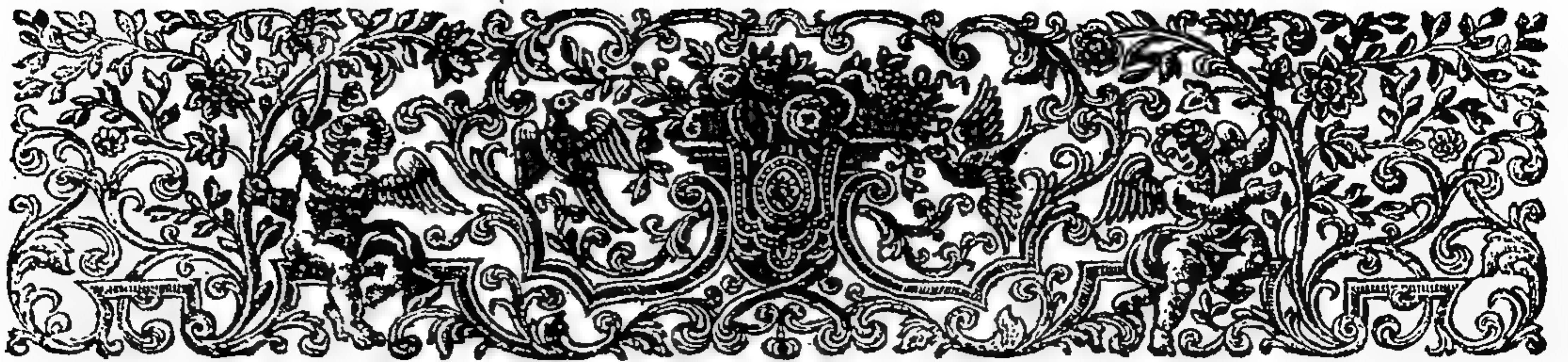
Such Wheat, after such Treatment, will turn out much better for Bread, though kept two or three Years or more in this Granary, and sell for a good deal more Money than it would have fetched in its first tainted and foul Condition.

Yet such Wheat, though by this Method made proper for Bread, should by no Means be used for Seed; for Kiln-drying, more or less, abates or destroys its vegetative Quality; and even without drying, a distempered Seed seldom or never fails of producing a distempered Crop.

J. S.

End of the TWELFTH BOOK.

A



A
COMPLEAT BODY
OF
HUSBANDRY.



BOOK XIII.

Of the Diseases of Cattle, and their Remedies. IN FIVE SECTIONS.

SECT. I. Of HORSES.

CHAP.

1. *Of the Glanders.*
2. *Of the mistaken Notions of the Glanders.*
3. *Of the real Situation and Source of the Glanders.*
4. *Of the Causes of the Glanders.*
5. *Of the Method of Cure for the Glanders.*
6. *Of the Liquor to be injected in the Glanders.*
7. *Of purging a Horse.*
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9. *Of the Care in taking a Horse up from Grass.*
10. *For a Cold.*
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16. *For the Farcy.*
17. *For the Malanders.*
18. *For Over-weariness.*
19. *For inward Heat.*
20. *For a scurfy Skin.*
21. *For sore Heels.*
22. *For the Cholick.*
23. *For Convulsions of the Bowels.*

CHAP.

24. *For Cracks about the Feet.*
25. *For swell'd Heels.*
26. *For a Strain.*
27. *For Running Eyes.*
28. *For a Film growing on the Eyes.*
29. *For Cramps.*
30. *For the Anticor.*
31. *For Sickness at the Stomach.*
32. *For the Yellows.*
33. *For the Swelling of the Spleen.*
34. *For a Heat of Urine.*
35. *For a Difficulty of Urine.*
36. *For Bloody Urine.*
37. *For the Vives.*
38. *For the Soreness of the Nostrils.*
39. *For a Bleeding at the Nose.*
40. *For Disorders in the Mouth.*
41. *For loose Teeth.*
42. *For Foundering.*
43. *For Wind-Galls.*
44. *For the Anbury.*
45. *Of a general Decay.*



The INTRODUCTION.

WE have thus, according to the Course and Method marked out in our Plan, gone thro' every Article of the Farmer's Concern respecting the Choice of his Cattle for Stock; and the Growth and Management of every useful Plant that he shall have Occasion to cultivate. We come now to consider those Disorders to which the several Kinds of Cattle are

liable, the Methods of guarding against them, and the Medicines most approved in their Cure.

We have had Occasion to observe, on many Occasions, how greatly the Farmer is mis-led by those who should give him Information in respect of the Management of his Crops; but this is an Article less understood, and more injudiciously treated than any other; and it is, at the same Time, of the greatest Concern. The Loss of his Cattle is not to be recruited but

at a very considerable Expence; and the Care of them is, in general, committed to Persons so very ignorant, that little better than their absolute Loss can be expected when they fall into any considerable Disorder. They must have Strength indeed, and good Luck into the Bargain, if they can escape from their Diseases and such Doctors.

Unhappily, while those Persons who undertake the Cure of these Creatures are so ill qualified to succeed in it, the Farmer himself is less able to judge right, than they are to act. It is a Part of needful Knowledge farthest of all removed from his Enquiries, and he is obliged to submit to every thing.

A few Names of Disorders got by Rote, are generally the whole Stock of the Country Leeches Knowledge, and these he applies at Random to any Disorder that comes before him, boldly, because he knows none can contradict him.

A smaller Store of Remedies serves his Purpose, than of Names for the Disorders; for these are People who, like the advertising Doctors, cure many Diseases with one Medicine. Their Physic they use as much at Random as the Names of Disorders; and the unhappy Farmer is stripped both of his Cattle and his Money by their Ignorance. If they destroy the Beast, which would, if let alone, have of itself recovered, he is persuaded the Violence of the Disorder killed it; and satisfies his Mind that he has done all he could.

This is the Condition of the Knowledge Country Pretenders, in general, have of the Diseases of Cattle: 'tis impossible to represent it worse than it is; but from this Condition of Ignorance we hope to restore it in the succeeding Chapters.

We shall insert in them nothing but what is the Result of Experience. We shall inform the Owner what he may do for his Cattle himself, and lay down such plain Rules for the Conduct of others, that he will be able to know whether they act according to Reason and Knowledge.

If the Practitioners will study in the same Pages, we promise them, they will find only Truth and what Experience confirm: we request them to peruse 'em carefully, not only for the Farmers Sakes, but their own; and hope they will consider the Harshness of what we have been obliged to say, as no more than a just Representation of their Need for better Information: 'tis one of those Wounds that is necessary to be opened deep, in order to reach the Cause of the Malady; and they know these soon heal when proper Methods are followed.

The Freedom we have taken with their Profession, is to let the Farmer into his Danger, in reposing too much Confidence in their Knowledge; for it is for his Service we are writing: at the same Time we shall observe, that there are many particular Practitioners of more Knowledge; and to these we refer what we shall publish on the Subject, desiring them to be Judges between us and their more ignorant Brethren, whether they do not deserve all we have told the Farmer concerning them by their rash Practice, and whether what we shall propose to them be not founded on the true Principles of the Art. We write for real Use, and have no Respect of Persons.

The Horse is the most valuable Creature in
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the Farmer's Stock, both with Respect to his Price and his Use. The whole Care of chusing, managing, and breeding this Animal, we have delivered in a preceding Part; but, in this Place, he claims a very particular Regard, both for the frequent Disorders to which he is liable, and the familiar and easy Methods by which the far greater Part of them may be remedied, when they are rightly understood.

We shall give Directions for preparing the several Kinds of Medicines useful on ordinary Occasions; and we shall also enter upon the worst Diseases to which he is subject, not contenting ourselves, in the customary Way, with setting down the Name of the Disease, and then the Remedy for it; but explaining what it is, before we give Directions what should be done to cure it: Without this, all that can be written is useless; and this has been the Reason that from what has hitherto been published on this Matter, so little Good has accrued, or so small a Share of Knowledge has been communicated either to the Farrier or the Farmer.



CHAP. I.

Of the Glanders.

WE have taken for the first Consideration, under the Article of the Diseases of Horses, this which is the most important of them all, and, in general, the least understood.

Many have called it incurable; and indeed, according to the old Practice, it must have been so: for if ever a Horse recovered under that Management, Nature must have performed the Cure: it is impossible they should so much as have assisted in it, who knew nothing of the Seat and Nature of the Disease.

Of late Years some Persons of Skill have undertaken the Cure of Horses; Anatomy has been called in to assist in the Operations; and Dissections made of morbid Bodies of that Animal, to shew the Cause, Situation, and Nature of their Diseases.

From this rational Method of Study, we have been made acquainted with the Origin and true Nature of the Disorders of these Creatures, and thence may proceed properly to the Cure.

With Respect to the Glanders, this was more wanted than in Regard of any other Disorder; and it is but very lately we have attained the Knowledge. A Farrier to the King's Stables in PARIS, his Name LAROSSE, made the Discovery; and the Royal Academy of Sciences received and adopted it. This is the true Road to Knowledge; when the most honourable Assemblies will receive and give their Sanction to Truth, from every Hand that offers it; and do Honour to any one who can do Service to the Public.



C H A P. II.

Of the mistaken Notions concerning the Glanders.

THE Glanders is a Disorder so well known, that it may seem superfluous to give any Account of its Appearance; but nothing is less understood, in general, than its Cause.

It is a Running at the Nostrils. First there is a whitish Liquor discharged; afterwards, as the Disease gathers Strength, a brownish Matter; and, last of all, a bloody Water.

All these are voided in very great Quantities, so that the Horse is offensive to the Sight, and the Discharge wastes him continually.

This is the Disease called the Glanders, which has destroyed Thousands of Horses; and from which very few have escaped that were once seized with it: not that the Disorder is incurable, but that from a universal Mistake, concerning its Nature, none knew how to go about to cure it.

The Reader will be astonished, that among so many Conjectures as have been made about this Disease, none came near the right; and that People should search in the remotest Parts of the Body for the Seat of a Disorder, which all the Time was situated where it appeared.

The various Opinions that have been advanced concerning the Origin and Nature of the Disease, have occasioned various and almost innumerable Methods of treating it to be proposed, and these Opinions being all erroneous as to the Cause, it is no Wonder that not one Horse was ever cured by the Methods established on those Principles. Where the Truth is not known, wrong Guesses are endless; and all that is founded upon them must be also erroneous.

The oldest Authors on these Subjects, supposed the Seat of the Disorder to lie in the Brain; and they imagined that, at last, the Brains themselves run out thro' the Nostrils, and to that attributed the Death of the Creatures: mistaken and erroneous as such an Opinion was, these were got nearer the Place of the Disorder than many who followed.

The next Conjecture was, that the Disease lay in the Back-Bone; and that the Discharge thro' the Nose proceeded from the Marrow of that Part. This was a received Opinion many Years among our Farriers, and is so, in most Places, to this Day; from whence they call the Disorder, The Mourning of the Chine.

Later Authors have supposed the Disease to be in the Liver, some in the Lungs, some in the Kidneys, and others in the Spleen: to all these proper Remedies have been proposed; and the Glanders has been attempted to be cured by Diuretics and Deobstruents.

Mr. SOLLEYSEL, an Author of great Credit, adopts all these Parts as possible Seats of the Disorder; and traces the Matter by Way of the Celiac Vein, up to the Head, where he supposes it is lodged upon the Parotid Glands, and thence discharged through the Nostrils. This

appeared so learned, that it was supposed it must be true: People are always ready to reverence what they do not understand; and the Farrier and the Farmer thought nothing could be a Secret to a Man who could use so many Words they never heard before. On this was founded a Practice for the Cure, which, like the rest, was as ineffectual as the System was erroneous.

After this, the Lungs were considered as the Seat of the Disorder. Others attributed it to Knots and Swellings under the Caul: the Authors of the Dictionary of TREVAUX, adopt the former of these Opinions; and the latter is found among the Systems in our Mr. CHAMBERS.

We have named these several Opinions, to tell the Farmer that they are erroneous. Experience, Dissections, and certain Observations, have shewn they are false: let him therefore take Care that he is not mis-led by them, and that he place no Dependence upon the Methods of Cure founded upon them.

In general, all internal Medicines are useless in this Case. The Horse may have a bad State of Blood at that Time, and this may render the Cure, in the Method here to be proposed, more difficult. In this Case, the common Sweetners of the Blood may be properly given at the Time he is under Cure; such as Brimstone and Antimony among his Corn, but otherwise they are not wanted.



C H A P. III.

Of the real Situation and Cause of the Glanders.

AFTER all that has been written plainly or pompously, learnedly or ignorantly, on this Subject, it is plain from observing the Nature and Progress of the Disorder, and from the fruitless Attempts founded on these Opinions to remedy it, that the Cause does not lie either in the Brain or the Back-Bone, the Liver or the Lungs, the Spleen or the Kidneys.

Anatomy, Observation, and a certain and regular Method of Cure, founded upon those Experiments and Observations, prove that the Seat of the Disorder is where it appears; that no Part of the Creature is affected but the Nostrils; and that the Disease really lies in the Glands, which are situated in the thin Skin that covers their Inside.

When the Glanders are only in one of the Nostrils, a strict Examination shews that the Gland, or, as Farriers call it, the Kernel, which lies near the Jaw-Bone on the same Side, is found to be swelled and inflamed, and not that on the other Side; but as soon as both Nostrils run, then both these Kernels are found to be swelled in the same Manner.

This Disorder may very naturally proceed from a Cold, without the Blood's being at all concerned in it; though it may happen, in other Cases, that the Blood is bad at the same Time, and then the Disease will be more difficult to cure.

When these Kernels are inflamed, the Running at the Nose comes on, and this is the first and gentlest

gentlest Stage of the Disorder. The Horse's holding down his Head to feed, and its natural Situation, combine to increase this Running; and thus a Disorder is begun in a natural Way, and continued by natural Means, which is generally strengthening itself, while the Farriers are attempting its Cure by Drenches; not one of which can possibly have the least Effect upon it, because they are levelled at an imaginary Cause.

For the Satisfaction of those who would not part with the Opinion of the Glanders proceeding from Disorders of the Lungs and Spleen, or the Liver and Kidneys, all these Parts have been examined by Dissection, in Horses that have died with the Disorder upon them in its utmost Violence, and they have been found all sound: therefore it is plain they have no Share in the Cause: it lies wholly, as we have shewn, in the Parts where it appears. It may come from a simple Cold in the Horse, without any other Disorder to cause it; tho' it may also, in some Instances, be occasioned by the Matter of a Disease falling upon that Part; or be rendered worse by a bad State of the Blood. In these, which are particular Cases, the Method of Cure is however to be the same with the small Allowances we have made already on that Head, of a bad State of the Blood; as to the other Case, it requires no particular Consideration; for though a Disorder of another Kind may have been the Cause of the Glanders, by settling on that Part, yet, when once settled there, it is the same as if the Glanders had come in a natural Way; and the same Method will prove a Remedy.

To explain the Seat and Nature of the Disorder perfectly to the Farmer, we are to inform him, that there is a thin Skin which lines every Part of the Nostrils of a Horse. This is the Seat of the Glanders. He will observe in the Nose of a Horse, a Partition going all along the Inside, which divides it into two Parts, or the two Nostrils. This Partition is covered in every Part with the Skin we have named: it is thin, soft and tender; and in it there are many small Kernels. These separate a soft Moisture for rendering the Skin supple and sensible; and this is all they are to do in their natural State; the Abundance of their Discharge being a trifling Thing, and thrown off without Offence: but these Kernels will, by being disordered, separate a larger Quantity of a fouler Matter, and this is the Glanders.

On each Side of the Partition which divides the two Nostrils, there are large Holes or Cavities. The same Skin which covers the Partition itself, is also continued to them, and forms a Covering to their Bottoms and Sides; but in this Part, the Kernels are fewer and smaller than elsewhere, and they only separate a very small Portion of the Moisture for just keeping the Skin there soft.

This is a very happy Provision of Nature; because the lowest and innermost Parts of these Hollows are so deep and winding, that if any Redundance of the Matter had been separated there, it could not have been discharged as in the other Parts; and Nature would have

been loaded and obstructed by the remaining of it upon the Place.

The Skull of a Horse is composed of several Parts; and in that Piece which forms the Forehead, just above the Place of the Eyes, there is a Space or Gap between the two Plates of the Bone: these make what are called the frontal Sinus's; but the Farmer, without troubling himself with remembering such Names, will understand that there are such Cavities; and this will be enough for his Purpose.

These Cavities are covered throughout on the Inside with this same Skin, which covers the Partition of the Nostrils; and it has in this Part the same Sort of Kernels as elsewhere.

All this Skin, and all the Kernels in it, are the Seat of the Glanders. In the Beginning, the Kernels only swell, and discharge a great deal too much Matter; and these in the Hollows of the Forehead-Bone most of all. They are therefore the main Seat of the Disease. When it becomes more violent, they are ulcerated or grow full of little Sores; then they discharge a more offensive Matter; and at length the whole Skin of this Part is enflamed, swelled, and eaten to Pieces, and then comes the Discharge of a bloody Matter.

This is no fancyful Supposition, but is the exact and real Fact found by Examination.

When the Head of a Horse, violently affected with the Glanders, is opened, not only the Kernels are found to be swelled and sore, but all this Skin is full of Ulcers; and it is seen to be grown much thicker than naturally, and fuller of Blood-Vessels; and these are eaten to Pieces at their Ends. From these flows the Blood, and from the ulcerated Glands the Matter, which are seen to come from the Nostrils of the Horse in this Disorder; and this is the true Nature and Cause of the Discharge: the Glanders is nothing but this, extending itself over every Part.

We have told the Farmer of the natural Hollows there are on each Side of the Partition of the Nostrils; and have observed, that Nature, in a State of Health, occasions so little of the natural Liquor of the Kernels to be separated here, that it serves only to moisten the Skin, because if more were separated there, as in other Parts, it could not be discharged, and would be a Burthen to her. This Mischief happens in the Case of the Glanders.

The Kernels in these Cavities are disordered like the rest; they grow ulcerated, and they discharge a great deal of Matter, which lodges, against the Intent of Nature, in these Hollows; and they are found full of it in a very offensive Condition, on the dissecting the Heads of Horses dead with this Disease.

In the same Manner also, the Kernels which are in that Part of the Skin which lines the Sides of the Hollow in the Forehead-Bone, grow swelled, enlarged, enflamed, and ulcerated; and the Skin itself grows thick, raw, and bloody. All this joins to confirm the Truth of that System, which places the Seat of the Glanders in this Skin, or Lining of the Nostrils and its Glands, and declares it not to be in the Liver or elsewhere; because in all Dissections of Horses
dead

dead with the Glanders, this Skin and its Kernels are found thus swelled, inflamed and ulcerated, and the Entrails are, as we have said, at the same Time found perfectly sound and good; unless when the Creature has had some other Malady beside.

These Hollows of the Forehead Bone in Horses dead with the Disorder, are found; like those by the Side of the Partition, full of thick offensive Matter: and the Change in the Skin itself is greater here than in any other Part. In a Horse that has died without the Glanders, this Skin upon Dissection is found to be thin, fine and soft, and there is never seen in it any Blood Vessel: doubtless there are such, though too small to be perceived by the Eye; but in this Case of a Horse dead with the Glanders, the Skin in this Part is thick, hard, and inflamed; and there are Blood Vessels seen all over it, with their Sides and Ends eaten to Pieces. In each Nostril are two Substances rolled up like Horns, and in the same Manner covered with the Skin which covers the Partition, and lines the Cavities; and in this Part this Skin is in the same Manner found to be enflamed, thickened, full of Blood Vessels, and ulcerated.

By this it is plain, that as the Skin we have described is the real Seat of the Glanders, so it is universally affected by that Disease whenever it appears, and no Part of it escapes.

The Disease first shews itself in those Parts of this Skin where the Kernels are biggest, and this is particularly the Case in the Hollows of the Forehead Bone; so that they may be called in a particular Manner the Seat of the Disorder: but it pursues its Course through the whole Extent of that Membrane.

It is in general much the same Structure that we find upon Dissection in the Head of a Horse, and in that of one of our own Species: but there is a particular Difference in those Glands or Kernels we have mentioned under the Jaw Bone, which one by one swell, as the Disease affects first one, and then the other Nostril.

There are the same Glands or Kernels in Men, and Anatomists call them the Sublingual Glands: but it is particular, that in Men they open into the Hollow of the Mouth; so that whatever they discharge is spit out, or otherwise managed as the Spittle: but in Horses they do not open into the Mouth, but turn backwards, and pass behind the Holes of the Nostrils.

The Mouth in Mankind is in a great Degree moistened by these Glands; and to supply that Office in Horses, as these have their Opening turned another Way, there are innumerable small Kernels all over the Insides of the Lips. Now though the Kernels we have just named are swelled in the very first Appearance of the Glanders, yet the others within the Lips are not at all affected: the Disease not being concerned with the Mouth, but only with the Glands of the Skin of the Nostrils.

It also appears to be a Disorder solely and particularly of this Skin and its Kernels; for it very rarely spreads to any other Part. In the extreme Degrees of the Disease, the Partition of the Nostrils which is covered by this Skin will be eaten, by the Sharpness of the Humour

thus surrounding it on every Side; but no Dissection ever shewed any other Bone to be affected by the Disease.

The Farmer who consults his own Reason upon the Result of all that has been said; will be convinced, in Spite of all that the whole List of his favourite Authors have written, that the Seat of the Glanders is entirely and only in this Skin of the Nostrils, and its Kernels: and he will thence be led to pursue the Cure upon the only rational Plan, the attempting it only in that Place.

If the Liver, the Lungs, or the Brain, or any other of these Parts, were the Seat of the Disease, the Creature must be pining, and disordered in other Respects beside this; and sooner or later would be carried off; whereas we see on the contrary, that this Disorder shews itself on Horses otherwise in perfect good Condition; and that when it has rendered them unfit for better Services, and they are delivered over to Hackney Coachmen, they live a long Time with it, and shew no Sign of any other Distemper. This, and the healthful Appearance of those Parts when the Horse is opened, shew that nothing there has been either the Cause of the Disorder, or has been so much as affected by it.

C H A P. IV.

Of the Causes of the Glanders.

WE have shewn the Farmer what this Disease is, and shall from that Explanation naturally lead him to the proper and only Method of Cure: but as every thing here is practical, we shall introduce between these Considerations something as to what may be the accidental Cause of it.

The Glanders may arise from a common Cold, as a stuffing up of the Nose in our own Species is the common Effect of the same Accident; and in this Case the first Approaches of the Disorder are to be guarded against, for they may be stopped, and that Mischief easily prevented, which it will be, after it should get rooted, very difficult to cure.

Thus, when a Horse has got a Cold, and it falls upon his Nostrils, let the Farmer remember that the Glanders are situated in this Part, and that a Cold is their natural Beginning. Let him remember that every Cold which falls upon this Part may settle into that terrible Disorder, and consequently take the first Care to remove it.

He will perceive when a Cold seizes this Part, by the Horses snorting and frequently tossing about his Head, and afterwards by the Nostrils being more than ordinarily wet.

In this Case nothing is so natural as its turning to the Glanders. If the Horse be in a feverish Disposition at the same Time, the Skin and its Kernels will enflame as well as swell, and all the Symptoms may very naturally follow.

This may give our Husbandman a just Notion of the Danger of a Cold to his Horses: a great Physician, when his Patient told him he had only a Cold, answered, "Would you have the Plague?" and there is the same Reason for considering that Disorder in the most serious Light, when it affects Horses.

If it seize upon the Nose let the Horse be immediately blooded largely : then give him twice in the Day a good warm Mash, and ride him gently afterwards. Keep him warm and clean, and the next Day give him the common Purge.

If this do not answer let him be blooded the Day after, as largely as at first, and pursue the same Course one Day more, and it rarely fails.

I have practised this myself, and I have recommended it to others ; and I am certain with the greatest Success. I have all the Reason in the World to believe I have prevented the Glanders in many a Horse ; and can say with the greatest Truth that I never had one, since I have followed this Practice, that has fallen to that Disorder, which I reasonably attribute to taking this Care in Time.

A Cold seizing upon the Nose is not the only Thing that may cause the Glanders. A Surfeit may very naturally take the same Effect. This fouls the Blood, and produces gross Humours in Abundance ; and these may very naturally be discharged by the Kernels in this Skin, such being their natural Office. This may swell, inflame, and ulcerate the Skin of the Nostrils, and be an immediate Cause of the Glanders ; and in this Way that Disease would probably be more dangerous than any other Way, and more difficult of Remedy.

In this Case however the Method of Cure must be the same, only with this Caution, that Sweeteners of the Blood must be given at the same Time. If this Caution should be omitted the Disorder might break out in the same Place again.

A farther Caution must be given the Farmer, that before he attempts to cure a Horse by the Method to be delivered in the next Chapter, he be assured that the Disorder is what he takes it to be : if he will observe carefully the several Symptoms we have set down, he cannot be deceived ; but he must take Care that he do not suppose every Running at a Horse's Nose to be the Glanders ; for in that Mistake he may sometimes set about a troublesome and harsh Method of Cure, for a Disorder that would perhaps have gone off of itself, or with a single Bleeding ; or he may, in some Cases, attempt to remedy that which is, in its own Nature, incurable ; and in the End disgrace the Method, because it would not cure a different Disease.

To explain this more fully, he is to observe the Difference between a Cold settling upon the Nostrils, and the Glanders. We have shewn this may bring on the Glanders, but it is not that Disease itself, and slighter Methods will cure it. On the other hand, an Abscess in the Lungs may discharge itself at the Nostrils of a Horse, and this, though it on a slight Observation resemble the Glanders, yet is altogether distinct in its Nature, Origin, and Situation ; and therefore cannot be reached by the proper Cure of that other Disease.

When a Horse runs at the Nose, let the Farmer observe the Nature and Colour of the Matter. If this be sharp, corroding, and ill-coloured, it looks like the Glanders, therefore let him next look into the Inside as far as he can ; and if he perceive the Skin swelled, inflamed, and full

of little Sores, there is little Room to doubt of its being this terrible Disorder. Let him next observe whether it runs continually, which if it does it is another Proof ; and lastly, let him examine the Horse in all other Respects, and if he find him in every other Circumstance well and healthy, he may conclude with Certainty that this is the Disease, and proceed to the Cure.

On the other Hand, if the Matter be thick and white, and the inner Part of the Nose not inflamed or ulcerated ; and if it run very little while he is at rest in the Stable, and encreases on his being put to work ; and finally, when he has a Difficulty of Breathing, and a rattling in his Breast as he takes his Breath, all these Symptoms considered together, will shew that the Disease is not the Glanders ; but an Abscess in the Lungs.

This is a Disorder which the proper Method of Cure for the Glanders cannot reach, therefore it will be vain to try it ; and indeed, as nothing can cure such a Malady, it is in vain to attempt any thing for it.



CHAP. V.

Of the Method of Cure for the Glanders.

WE see that the Glanders is a Collection of Ulcers in the Skin of the Inside of the Nose, and its Glands : this is the whole Fact ; and knowing this we may advance rationally to the Cure.

The only Method of effecting this must be by cleansing and freeing the Parts from the Lodgment of this sharp Matter, and the healing of these several Ulcers.

That might be done in the same Manner as external Sores are cleansed and healed, but the Difficulty is how to come at these for the dressing, cleansing and healing them. It is plain this cannot be done by the Nostrils, for there is no Way of getting freely and properly at the Complaint by this Method, therefore the first Thing is to be to make the Opening to the Place where Nature has not given any. We know now that the principal Seat of the Disease is the Glands or Kernels of this Skin, within the Cavity of the Forehead Bone, and we are to proceed accordingly.

When the Skull is cracked, and beat in by a Fall or Blow in our own Species, the Surgeon cuts a Hole through it in another Place, that he may have Way to come at the depressed Part within. This Operation is very terrible but very safe : it is practised continually, and with Success. What we are ourselves able to endure, certainly this coarser Creature may. On this has been founded the only rational Method ever laid down for the Cure of the Glanders.

A Hole is to be pierced through the Skull of a Horse, in such a Place as is least liable to Inconvenience, and most properly situated for the throwing in proper Liquors to the Seat of the Disorder.

The first Consideration in this Respect is, whether the Glanders be seated only in one Nostril, or whether it have seized on both : if only one be affected, then one such Opening through the

Skull will be enough: if both Nostrils be infected with the Disorder, then two such Openings are to be made, one for each.

The Place for this Opening to be made therefore is, on one Side or both Sides the Head. It may be done without the least Inconvenience or Hurt to the Creature, and it will give a free Passage to the necessary Applications. The best Place for the Hole to be opened is at some Distance below the Eye; and there is not the least Danger from the Operation.

In the performing it on the Human Species, if any bad Consequences ever attend it, they are not owing to the cutting a Hole through the Bone, but to the injudicious Hand of the Operator hurting the Brain in doing it. Now in Horses the Brain does not come so low as to the Eyes; and therefore in making two Holes, or more if necessary lower down, there is not the least Danger of any bad Accident.

The Safety of this leading Operation being thus shewn, the Use of it is evident. The proper Liquors for washing and cleaning of the Parts, are to be thrown in at these Openings by a Syringe; and the Holes are to be so made that the Syringe being pointed upwards, the Hollow in the Forehead Bone, which we have shewn to be the great Seat of the Disease, may be thoroughly washed by it. It would be very much to be wished, that the opening could be made just where this Hollow of the Forehead Bone is; but that lies so high that a Farrier might do Mischief. The Brain is situated there for the Part is considerably above the Eyes, and more toward the Middle of the Head, but it will answer every good Purpose of this Method if it be made lower, and the Liquor be thrown up into it. In this Method one Aperture or Hole may be made to answer the Purpose in most Cases, though there will not be the least Disadvantage in making two or more for better Convenience.

Though the Cavity or Hollow in the Forehead Bone lies highest; yet the Hollows we have described before at the Sides of the Partition of the Nostrils are the most difficult to be well cleaned. Upon two Principles alone turns the whole Method of Cure in this Case; the first is, that there be a Way by which the Liquor intended for washing and cleansing the Parts can be conveyed to them through a Syringe; and the other is, that when the Matter is thus wash'd off from the Skin and its Kernels, there be a Passage for the Liquor and that foul Matter to go off freely together.

Now in Respect of the Matter lodged in the Hollow of the Forehead Bone, that being wash'd away by the Liquor from the Syringe will very freely and naturally discharge itself, together with that Liquor, out at the Nostrils; but it is not so in the natural State of Things, with Respect to the Matter which fouls the Inside of the Hollows situated at the Sides of the Partitions of the Nose; for we have shewn already that they are so deep and crooked, that there is no Way of getting any thing once lodged there, out of their Bottoms, by the natural Passages.

This incurs the Necessity of another Opening

in the Bone, to be made by Art, but as this must be much lower than the other, there can be no Danger in the making it. All below the Eyes in a Horse's Head should be considered as the Bone of the Nose, not the Skull; we understand by Skull the bony Covering of the Brain, and there is no Brain within or near that Part.

Thus the Farmer sees that an Opening in this Place is altogether necessary, and not at all dangerous. It would be in vain to wash off the Matter in these Cavities ever so clean, if, when that were done, a Part of it must of Necessity be left in the Cavity, together with some of the Liquor of the Syringe; but this is easily to be discharged in this Manner.

Upon this Consideration, the very best Place for making this Opening to wash and clean these Cavities, is to pierce through the bony Divisions; and then to open another Hole somewhat lower, to give Passage for all that is wash'd out.

The best Direction for the exact Place of these Holes is, that the Farmer and the Farrier together examine the Skull of a dead Horse. They will there see how these several Cavities are placed, and by that know better than by any formal Directions of Words or Figures, where to make them.

When these Holes are opened, and the Syringe is used, the proper Method is to throw in the Liquor forcibly; and then to stop the Nostril, that it may be forced out at this Hole, by which Means all will be perfectly cleared; and by a Repetition of this cleansing, and an Injection of proper Liquors, the Disease will be perfectly and thoroughly cured. This reduces the Glanders to the Condition of an outward Malady, and it is thus to be remedied in the same Manner.

In Case of the Matter, together with the Injection, not coming freely and perfectly out at the lower Opening, nothing more is needful than to make Way for it by thrusting in the Point of any sharp Iron Instrument. It frequently happens that the Bones have a particular Construction in this Part; but when they have it is attended with no farther Difficulty. This Conformation may stop in the Matter, or a Part of it, and the Opening thus made never fails to discharge it. If the Opening made by the Point of the Instrument, should close up before the Time, it may be kept open by burning it with a red hot Iron.

This Method of Cure was proposed in FRANCE, and there very well received; and there is no Question of its Success wherever it shall be introduced. We have shewn the whole Design and Nature of the Operation, and shall in the next Chapter treat of the best Methods of preparing the needful Liquors for injecting.

C H A P. VI.

Of the Liquors to be injected for a Cure of the Glanders.

WE have now to lay before the Farmer the most proper Liquors for performing the Cure, and these we shall advise to be of three Kinds; the first cleansing alone, the second cleansing and healing, and the third Spirituous and Styptick.

For the first Liquor let him proceed thus, set on three Gallons of Water to boil, and have ready three Pounds of fine Stone Lime new made. When the Water boils pour it into a Pan, large enough to hold three Times the Quantity, and by Degrees put in the Lime. There will be a great swelling and boiling up, and when all is over, and the whole thoroughly cold, the Water will swim clear and transparent at the Top, and the Lime will be settled in a white Powder at the Bottom.

Pour off this clean Liquor, and set it by all Night; then in the Morning there will be a Skin upon it; scum this off and bottle up the clear Water. This is Lime Water of an exact Degree of Strength for the intended Purpose. Let the Farmer be sure not to buy it, but to make it himself in this Manner.

To a Quart of this Lime Water put a Quarter of a Pint of Vinegar, and half an Ounce of Basket Salt, let it all melt together, and then it will be fit for Use.

Two Openings being made in the Head of the Horse, let a Pewter Syringe be got, that has a good Strength to throw the Liquor out, and that will hold about half a Pint.

Set on this Quantity of the Liquor just named, to warm; and when it is of such Heat that the Hand can be bore in it ever so long without Pain, it is fit for Use. Hold the Nostrils of the Horse together, and drive in this Liquor carefully and forcibly. It will run out partly at the lower Hole, and partly at the Nostrils, when they are let open; as they should be at a proper Time, when the greatest Part of the Liquor has gone the other Way.

When this Syringe full has been used in this Manner, heat as much more, and throw it up in the like Way. Then let the Horse rest twelve Hours, after which repeat the same Method exactly.

Morning and Night are the best Times of doing it; and this is to be continued four Days, but with the Use of the second Liquor in the Middle, and at the End of that Time.

The second Liquor is thus prepared. Set a Fire Shovel over a very gentle Fire, and put into it a quarter of an Ounce of green Copperas beat to Powder: stir it about, till it becomes a dry grey Dust. Put this into two Quarts of Molasses Spirit; and add a little Scrapings of Oak Galls. Shake this up and set it by all Night. In the Morning it will be black like Ink, and this is a cheap and easy Way of preparing the famous Styptick of Helvetius.

Upon the second Day use the Water with

the Syringe, at Four o'Clock in the Afternoon, instead of late in the Evening; and, towards Night, warm half a Pint of this black Tincture.

Throw this up with the Syringe in the same Manner as the other; and leave the Horse to his Rest.

The same do on the Evening of the fourth Day, and then prepare the third Liquor.

Powder a Quarter of a Pound of Alum, and add to it the same Quantity of white Vitriol. Put them into a strong Earthen Pipkin, without any Water, and set them over the Fire; they will melt and afterwards dry again.

Then take them off, grind the Whole to Powder, and put it into a large Jar: pour upon it a Gallon of the Lime-Water just directed to be made, stir them well together with a Stick, and leave them all Night.

In the Morning pour off the clear Liquor, leaving the Settlement behind; add to it a Quart of strong Vinegar, and bottle it for Use.

This is to be the Liquor for injecting, after the four first Days.

Every Morning and Evening warm a Pint of this, and carefully throw it up by the Syringe, observing to stop the Nostrils at first, that the greatest Part of the Liquor may each Time run out through the lower Hole in the Face: then let some of it come last of all through the Nostrils; by this Means, every Part of the affected Skin will be washed and cleansed twice a Day by this excellent Liquor; and, by Degrees, the Whole will heal.

Every other Day, instead of Evening, the last Injection of the Water must be performed in the Afternoon, as directed in the preceding Article; and at Night of each of those Days, the Black Tincture is to be injected, as directed before.

This is a plain, rational, and safe Method of Proceeding; and by this Means the Glanders will be perfectly cured, at a very small Expence, and with no great Trouble. Many serviceable Horses will be preserved from the Dogs, or from the meanest Employments, and rendered as valuable as if the Disease had never attacked them.

As to the Time required to perfect a Cure, it will be different, according to the Degree of the Disorder; but, in general, it may be called three Weeks or a Month; the Progress of the Cure will be seen by the Stoppage of the Running; and it will always be adviseable to continue the Injections a Fortnight after the Cure seems perfect, every other or every third Day.

If the Flesh grow fast about the Openings, it must be kept down by a hot Iron; for there must be preserved all the Time a free Passage for the Liquor both in and out; and if the Horse be otherwise disordered, Brimstone and Antimony are to be mixed and sprinkled over his Proven-der.

C H A P. VII.

Of Purging a Horse.

THERE are a great Variety of Occasions on which this Creature may want purging, and many Sorts of Physic may answer the Purpose; but before we come to the Method of preparing any of these, it will be necessary to give the Farmer proper Directions concerning the Use of such Medicines. A Horse must be prepared for a Purge the Day before it is given him, or it will take very little Effect; and then it will operate more or less, according to the Management of him during the Time.

The Day before a Horse is to be purged, give him a good Quantity of Water with scalded Bran in it, and let him have it warm. Keep him quiet, and the next Morning, before he has any thing to eat, give him the Purge. Any one of the following will answer the common Purposes, with little Charge.

1. *A Purge with Aloes.*

Take an Ounce and a Quarter of Horse-Aloes beaten to Powder, and a Quarter of an Ounce of Cream of Tartar, mix these up with an Ounce and a half of fresh Butter, and half an Ounce of Powder of Anniseeds, work this up into a Consistence, and roll it round into two Balls. Rub these over with Butter, and give them to the Horse; they will, by Means of being greased, slip down very freely; and after them give him a Horn of small Beer made warm.

The Dose is to be made larger or smaller, as the Horse is larger and coarser fed, or finer limb'd, and managed more delicately. There is as much Difference between the Constitution of a Cart-Horse and a Racer, as between a Drayman and a Person of Quality; and they must in all Respects be treated accordingly, not only in the Strength of the Dose, but in the Management afterwards: for what suits one will be quite improper for the other.

2. *A Purge with Jalap.*

Take Powder of Aloes an Ounce, Powder of Jalap a Quarter of an Ounce, and powdered Ginger a Dram: mix all these up with two Ounces of fresh Butter, and make the Whole into a Couple of Balls, or more; grease them on the Outside, and give them to the Horse with some warm Ale afterwards. These are two common Receipts, but they are often ill proportioned in the Quantities; something of this Kind stands under the Name of a Purge for Horses in most Books that treat of these Things; but the Quantity of the Anniseeds is too great, in the common Directions for the first; and this will make a Horse sick afterwards; and to the other there are commonly added useless Ingredients. These are approved Proportions, and they will answer almost every Occasion there can be for a Horse's being physicked in this Way.

C H A P. VIII.

Of managing a Horse with his Physic.

WE have directed how a Horse is to be prepared for his Purge, by giving him a proper Drink the Day before: but it is needful we tell the Farmer how he is to conduct him when he has swallowed it.

Let the Balls and the Beer be given him early in the Morning, and let him then be rid out gently for a Quarter of an Hour. Then bring him cool in, and let him be set up two Hours without Food.

After this Time give him a small Quantity of good Hay, and a Quarter of an Hour after that some warm Water.

An Hour after this give him some scalded Bran. He will purge kindly after this Manner of Management; and after this he should be rid out a little again; then when he is brought in, he should have some Bran and Water warm, with but a small Quantity of the Water. Then led him be rid out again; in this Manner a Horse is to be treated with his Purge, and, in general, it will be easy to make it work more or less at Pleasure, by giving him more or less Exercise, and more or less of the Bran and Water.

If the Purge have been too violent, and will not stop, the following Astringent Drink will always stop it.

An Astringent Drink.

Boil three Pints of stale Beer, and some Pieces of Crust of brown Bread: to this put an Ounce of Whiting, and a Quarter of an Ounce of Diascordium, made without Honey: if this does not stop it, in four or five Hours, give the same Quantity of Whiting, and double the Quantity of Diascordium, in only one Pint of the Beer and Bread. This will make him altogether quiet and easy, and he will be in his Body as usual.

C H A P. IX.

The Care of a Horse in taking him up from Grass.

IT is a common Thing, and generally very proper, to purge a Horse when taken up from Grass; but this must not be done immediately on taking up; he ought to be kept in the Stable a Week; and he should have scalded Bran twice before the Purge.

There must be a great deal of Care taken of a Horse, in general, in the taking him up from Grass, otherwise he will fall into Disorders very difficult to cure. It is much better to prevent them by a timely Care.

He must be dry when taken up from the Pasture, otherwise he will very likely grow scabby.

BARTHOLOMEW-TIME is the latest he should be left out, if of any thing a tender Make; for after

after this Time he will have more Cold and less Nourishment.

The Dews are very nipping after this Season, and the Grass has lost its Strength; so that partly for Want of Nourishment, and partly for the chilling of his Blood, it is much if he escape some Disorder. Many a Horse has been rendered unserviceable the greatest Part of the Winter, and been an Expence into the Bargain, from the leaving him out a little too long.

It is a very good Method with a delicate Horse, to trim him as soon as he is taken from Grass. To this Purpose, he is to be led out in a fine warm Day, and when he is trim'd, some Soap and a good Quantity of warm Water is to be got ready. He is to be rubbed over with the Soap, taking Care it does not get into his Eyes or Ears, and then washed with the warm Water and some Flannel-Cloths: this is to be done twice over, and he is then to be led into the Stable, and gently rubbed with a Cloth till perfectly dry.

This Cleaning is very comfortable to the Creature, and at the same Time takes off all Sorts of Foulness got at Grass, of which there are many Kinds not to be met with in the Stable. He is then to be kept a Week or more in the Stable, and purged and blooded. This Course naturally and perfectly reconciles him to the new Method of living, and he falls into no Disorder.

C H A P. X.

For a Cold.

THIS is a Disorder so well understood, that it cannot be mistaken, nor does it need any Explanation.

Boil in a Quart of Ale three Ounces of fresh Liquorice-Root, beat very fine into Threads. Strain the Liquor off, pressing it hard, and add to it three Drams of Elecampane Powder, one Dram of Powder of Anniseeds, a Quarter of a Pint of Oil, and a Quarter of a Pound of Honey; mix all well, and give it warm. If it does not take Effect the first Time, let it be repeated three or four Times, and it seldom fails.

Balls for a Cold of long standing.

Put into a large Bowl six Pounds of Wheat Meal, mix with it two Ounces of Powder of Anniseeds, Cummin-seed one Ounce, Linseed three Ounces, Fenugreek-seed one Ounce and a half; stir these well about, then mix half a Pound of Liquorice Powder, and a Quarter of a Pound of Flour of Brimstone, add these to the rest. Lastly, add Bay-berries and Juniper-berries, powdered; three Ounces of each, and the same Quantity of Powder of Elecampane.

When all are well stirred and mixed together, break six Eggs, throw away the Whites, beat up the Yolks with two Quarts of Mountain Wine. Add to this a Pound and a half of Honey and a Pint of Sallad Oil. Mix all these perfectly well together; then bring in the Powder, and work the Whole to a Paste. If this should be too stiff, a little more Wine must be added; and, if too soft, some Flour must be added.

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put in, till the Whole be of such a Consistence that it will conveniently roll into Balls.

These are to be made of the Bigness of a Hen's Egg, but round. This rolling them up is only for the Convenience of keeping; when they are to be used they are to be dissolved. Two is the proper Quantity for a Dose, and they are to be melted in the Creature's Water, Morning and Evening, for fifteen Days.

C H A P. XI.

For the Sleeping Evil.

THE Sleeping Evil in Horses, is the same that we call the Lethargy in our own Species, and it will be as fatal to them as it is to ourselves, if not remedied in Time. The Cause is their eating a great Quantity of coarse Food, and having less Work than usual.

It shews itself by their being sluggish, and continually sleeping or dozing: the Remedy is the following Ball.

Pound in a Marble Mortar a Handful of the Plant called Wall-Pepper, or sharp Stone-Crop; it is a common creeping Plant upon Walls, and bears yellow Flowers. Put to this a very little White Wine, and squeeze out the Juice. Grind in a Mortar four Ounces of Elecampane Powder, and one Dram of Powder of Pellitory of SPAIN; add the Juice to these, and then put in a Quarter of a Pound of CASTILE Soap, work and beat all well together; and then put in Liquorice Powder by a little at a time, to bring it to a soft Paste. Keep this in a Pot, and every Morning, before he has taken any Food, give him a Piece of it as big as a large Walnut, greased. Let him drink Milk and Water, warmed, after it, and keep him stirring.

This is a Receipt I have seen try'd many Times, and never once found it fail to make a perfect Cure.

C H A P. XII.

For the Gargle.

THIS is a Disorder that principally affects the Head and Throat of the Horse, and, if not taken in Time, is very dangerous. It is also unfortunate for the Farmer in another Respect, for it is contagious; and, from one Horse will spread itself through a whole Stable.

It is most dangerous in the Autumn of the Year, and generally attends very dry Seasons, when there being a Scarcity of Water, the Horses are forced to drink what is foul and bad.

I have also known it plainly caused by Horses feeding upon a poor bad Grass in wet Places; where there generally lies Water over the Ground; but it happens to be dry at these Seasons. Some Horses are fond of this filthy Food: I have observed their Chops all dirted with eating it down to the Stumps; and generally the Gargle has followed.

A Horse that has the Gargle hangs down his Head and is restless: he breathes with Difficulty;

culty; his Eyes are gummy, and his Head swells; he rattles in the Throat, and he goes weakly and staggering.

As soon as the Farmer sees this Disorder in a Horse, let him separate the Creature from the Rest; and it will be very proper to bleed them all by Way of Prevention.

Then bleeding the sick Horse more largely than the others, give him the following Drench.

Set on two Quarts of Ale to boil, and as it heats stir in a Dram of Saffron cut small with a Pair of Scissars, and Half an Ounce of Philonium Romanum. Bruise two Heads of Garlick and two good Handfuls of Wormwood, press out the Juice squeezing it very hard, and pour this to the Rest; let it boil a little, and then set it off.

This is for two Doses; if the Horse be very bad, he may have one in the Morning and another at Night; and if not so violently taken, one at Night only will do, keeping him three Hours without Food before, and giving him nothing after it.

Let this be repeated every Day, or every other Day, according to the Degree of the Disorder, for four Times, and let him all the while be kept warm, and give him boiled Oats and ground Malt in a Mash.

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C H A P. XIII.

For Roughness of the Coat and Swelling of the Heels.

WHEN a Horse grows rough in a Stable in Spite of the usual Care, and his Heels swell, the following Mixture is to be given him with all his Food.

Take a Pound of Flower of Brimstone, half a Pound of Turmerick, and a Quarter of a Pound of Crude Antimony in Powder. Sift these together; by which Means they will be thoroughly mixed, and strew a little of it over and among all his Victuals.

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C H A P. XIV.

For a ravenous Appetite.

THERE is a Disorder in our own Species which Doctors call a Canine Appetite, that is an Appetite like a Dog, greedy and devouring every thing, with no Advantage to the Body. Horses are subject to the same, and they will consume more than their due Quantity of Food if it be given them, and still be poor and lean. In this Disorder they swallow their Meat without chewing it. It is much more common than is thought; and we advise all who are concerned with Horses to regard it. They may know it by watching the Horse's Manner of eating, and by observing his Stools.

If he snatches at every thing, and eats greedily and vastly quick, it is a suspicious Circumstance; and if his Food be seen in a Manner entire and unaltered in his Dung, it is a Proof. When Horses have this ravenous Appetite to a great

Degree, their Provender will go through them quite unaltered, and they will grow poor and weak till they are useless. In this Case give him the following Drench.

Mix together a Gallon of Milk and a Quart of Oil: stir in as much raw Wheat Flour as will mix in without making it too thick for swallowing easily. Give him a good Drench of this every Morning before he tastes any Food, and about half an Hour after offer him some Hay. He will not be so ravenous, though he has eat nothing: give him a moderate Quantity, and then let him be quiet.

When he has been rode out a little, or worked for some Hours, give him some more Hay. He will snatch at it and be ravenous as usual; but let him have only a little at a Time, and let him see no more. This Way feed him to the Fill by a little at a Time, till he will not eat any more; then set a good Quantity before him, but don't let it remain a great while in his Sight.

Repeat this Conduct every Day for a Week, and he will eat like other Horses. I have seen this tried very frequently and successfully.

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C H A P. XV.

For the Stagers.

THIS is a very terrible Disease, and has been fatal to many a stout Creature.

The principal Cause of it is the Carelessness of Servants, in turning a Horse out to Grass while he is hot from Travel or Labour. This gives him a violent Cold; which loads his Head with a tough Phlegm.

A Horse is known to have the Stagers by his tottering, staggering, and going weakly and faintly. His Eyes will be waterish, and at first he will thrust his Head into the Litter, and by tossing it up and down shew his great Uneasiness: in the more violent State of the Disease he will beat his Head against the Wall in his Agony.

This is a Disease so dangerous, that it should be watched in the beginning; for it is then much easier cured than afterwards.

The first Thing is to bleed him; and this must be largely. If the Disorder be perceived in Time, a good Bleeding alone is often a Cure. Some advise bleeding in the Flank, but it is of no Consequence from what Part, except in the Head itself; which, if the first Bleeding do not succeed, may be very well done during the Use of the other Remedies.

We see frequently, that a natural Bleeding at the Nose carries off Disorders of the Head in ourselves almost immediately. The Sailors have a Way of bleeding themselves in violent Head-achs between the Gristles at the End of the Nose, and they find great Relief from it: and Dr. DOVER tried very hard to bring up the Custom of bleeding in the same Part more artfully. I have known it tried sometimes, and always with Success; but neither the Surgeons nor the Patients liked it, so it presently dropped. The Good accruing from this bleeding, though in never so small a Quantity, shews what may be done

done for a Horse in this terrible Disorder of the Head the same Way. The Country Farriers Method of doing it is a very coarse one, but I have seen it succeed well, and great Good arise from it.

They sharpen a tough small Oak Stick, and split it at the End like a Fork. They thrust this up the Horses Nostrils, and set them bleeding; and this is very successful. It may be done after two Days, if the following Medicines do not take Effect.

Two Hours after the common bleeding give him the following Glyster. Heat two Quarts of Emetick Wine, and dissolve in it a quarter of a Pound of Unguentum Populneum: throw up this as a Glyster and let him rest.

Mean time prepare the following Medicine: boil together two Ounces of Powder of the Scoria of Liver of Antimony and five Pints of strong Beer. When it has boiled five Minutes take it off the Fire: dissolve in it a Quarter of a Pound of Butter.

An Hour after the first Glyster has come away give this in the same Manner, and then walk him gently out in a warm dry Place. Rub his Legs well with Whisps of Straw wetted in some Water, and feed him with Bran and Bread, and warm Water.

Two Hours after the second Glyster has come away, dissolve an Ounce of Venice Treacle in a Pint of White Wine, and give it to him as a Drench: and presently after give him another Glyster thus made.

Boil a double Handful of Mallows Roots and all in two Quarts of Spring Water to a Quart; then add to this when strain'd off two Ounces of Sal Polycrystum, the same Quantity of Venice Treacle, and three Quarters of a Pint of Oil: give this warm, and set him up for Rest.

The next Day let one or other of these Glysters be repeated as Occasion may require; and put into his Ears some pounded Rue, black Hellebore Root and Pepper mixed up with Brandy. Sow up his Ears to keep this in, and let it remain there all Day. Give him the following Drink. Boil in two Quarts of Ale two Ounces of Turnericke, and the same Quantity of Anise Seeds in Powder; add to the strained Liquor a Quarter of a Pint of Brandy, and give it for a Drench.

The Disorder is a very severe one; so that it commonly soon terminates either in the Death of the Creature, or in his Recovery from the immediate Danger: but sometimes, though he get soon out of Danger, he recovers slowly. In this Case the Glyster need not be repeated, but he should continue in a Course of the Drench for some Time, and be kept carefully warm and well rubbed.

There is also a famous Remedy which often assists the others greatly; or sometimes succeeds by itself: it is this.

Dig up a Dock Root and quarter it; cut a Slip of the Thickness of Half a Finger, and an Inch long: spread a Plaister of common Pitch of Half the Breadth of the Palm of the Hand: these two Things being in Readiness, cut a Slit through the Skin to the Bone in the Middle of

the Horse's Forehead: lay in the Piece of Dock-Root, and cover it with the Plaister.

If it runs in twelve Hours, the Horse will be likely to recover; if not at all, the Case is desperate. These Methods have recovered many a Horse in my own Stable; and I can therefore recommend them from Experience. Indeed I shall set down here none but such as I have either tried myself, or have been told of from the Experience of People of Credit.

C H A P. XVI.

For the Farcy.

THE Farcy is not so desperate or violent a Disease as the last described; but it is the most loathsome that can be conceived: it is a creeping Ulcer, that spreads and runs in a most offensive Manner; and is not easily remedied when got to any Height.

The first Appearance of it is in hard Knobs and Lumps; and these spread till they over-run the greatest Part of the Body in this filthy Manner.

It is owing to a disordered State of the Blood from bad Food and unreasonable Fatigues; and when a Horse is in a Condition to receive the Disease, sometimes it will be caught by standing near another that has it. Indeed when the Blood is disposed for it, a very little external Injury will bring it on; the spurring with a rusty Spur, the wounding the Mouth with the Bridle, the galling with the Belt, or any other Hurt.

Often a Horse will itch so in some Part with the Foulness of his Blood, that he will rub till he breaks the Skin, and the Disorder shall begin that Way, and spread quickly. The principal Cause is what we have named, unreasonable Fatigues, and Heats and Colds suddenly upon them; but we must warn the Farmer of one Way of its coming which few are aware of; which is the fattening up a Horse hastily, and taking him from a laborious Life to a quiet Stable.

I have seen this Error frequently made. A Farmer having a Design to part with a Horse, has taken him up to fatten in a Hurry; and instead of answering his Purpose, has given him this Disorder.

It is to be cured most easily when taken in Time; but the Generality of the Country People are so unused to these Considerations, that they don't perceive the Disease till it is at the Height.

I saw a Neighbour JAMES BARNES's Horse in 1738 cured perfectly, when it was taken in Time, in about a Fortnight; and it was done thus. First the Horse was blooded largely in the Neck; then the whole Body of him was carefully looked over, and several of the Knobs were found in different Parts, beside the two or three that were burst.

A Liquor was thus made to rub them. Take Half a Pound of Wood-Soot, and the same Quantity of Soap Lees, boil them up together; put in two Ounces of Allum, and an Ounce of Verdigrease, and a little Water, and stir all well together; then put in a Dram of Powder of

Euphor-

Euphorbium, and four Ounces of Powder of white Hellebore Root: let the whole boil up together, and then pour it into a Jar.

With this the Horse was rubbed in all the Places where the Disease appeared; and at the same Time a good deal of Flour of Brimstone was given him in his Food. The Cure was perfected by this Means, and the Disease never returned.

Another Method is to anoint the Places with Ratsbane mixed up with Butter; and at the same Time give him the following Drench. Take a Handful of the inner Bark of the Elder, the same Quantity of the inner Bark of the Walnut Tree, and the same of Berberry Bark; cut all these small, and put them into two Quarts of strong Beer: let them boil a considerable Time. Near the End of the boiling throw in a Handful of Wall Pepper shred fine. When it has boiled up once or twice with this, strain off the Liquor, pressing it hard.

Put to the strained Liquor a Quarter of an Ounce of Grains of Paradise, and an Ounce of Powder of Turmeric, and give it for one Dose.

This must be repeated every Day as long as the outward Remedy is used; and the best Management of the Horse during such a Cure, is to give him moderate Exercise and moderate Food: any Extream is equally wrong.

When the Disease is in its worst State, the Sores will not give Way to any of these Applications. They must be burnt with a hot Iron, and then the same Course followed that has been directed already: for the same Remedies that would take no Effect before, will answer the Purpose after the Effect of the hot Iron.

CHAP. XVII.

Of the Malanders.

THIS is another external Disorder of a Horse very painful and troublesome, and very difficult of Cure; insomuch that some say nothing more is to be attempted than to alleviate the Pain; and that it is dangerous to stop the Distemper.

This is a very unhappy Error; for there is no Degree of the Malanders but may be cured by proper Management; and that with perfect Safety.

This Disease shews itself on the fore Legs, upon the inner Part just against the bending of the Knee.

It is not a Knob or Ulcer like the Farcy, but a hard, dry, flat Scab, of which sometimes there is only one great one, sometimes several smaller; and these are cracked and chopped upon the Surface, and have stiff Hairs like Bristles growing upon them.

This is the whole of the Disorder: it sometimes is very violent and inveterate, sometimes more slight. When it is very bad it makes the Horse halt; and when least it occasions him to go stiff till warmed with Exercise.

The general Cause of the Malanders is bad Management. It is the common Disorder of Horses kept in a slovenly Manner, and much

more rarely affects those which are managed more carefully.

Those Horses are most subject to it which have most Hair upon their Legs; and they are the difficultest of Cure.

One essential Difference the Farmer is to make in his Conduct, for a Horse under this Disorder, which arises from this Consideration, that sometimes the Malander is only a Soreness in the Part, while the Horse is otherwise in Health; sometimes the Blood is corrupt and bad, and in this Case the Disorder is more violent in its Degree, and more difficult to be cured.

When the Malander is only the Effect of Carelessness, and 'tis upon a Horse otherwise healthy, the Method to be observed is this.

Let him be kept to his usual Work and usual Food; and let the following Wash be made for the Part. Set on a Saucepan with three Quarts of Water, put to it half a Pound of Fenugreek Seed bruised, and a Pound of fresh Marshmallow Root cut in Slices. Boil all this till it is like a Jelly, strain it off hot and press it hard out, then add to the thick Liquor half a Pound of Opodeldock Ointment. Make some of this hot Morning and Night, and dipping Flannels in it, wrap them round the Leg where the Complaint is, as hot as the Hand can bear to touch them. Let this be several Times repeated; and at the last of all, wet some of the Ingredients, which must be saved when the Liquor has been pressed out, with some of the Liquor hot, and lay them upon one Flannel, cover them with another, and wrap the whole round each Leg, tying it round so as to keep it on, but not tight.

Let this be done every Day twice, as directed, till the hard Substances begin to soften; after this once in four and twenty Hours will do; and there will thus be a perfect Cure.

Before the first Dressing let the Hair be clip'd round about the Place, and the whole Part about the Malanders wash'd clean with warm Soap Suds. Let this be repeated at Times during the Cure; and after it is perfected, let the Legs be kept very clean in this Part, for fear of its returning.

In this Manner a Horse will be cured very easily, and very certainly, that has no Taint in his Blood: but if there be that added to the outward Malady, Care must be taken accordingly, by giving inward Medicines at the same Time.

When this is the Case the Owner will perceive it by his Habit of Body; and by the outward Remedy not taking its desired and natural Effect, he is then to proceed thus.

Let a Pound of crude Antimony in Powder be mixed with four Pounds of Flowers of Brimstone; and let some of this be sprinkled among all his Food. This is better in such a Case than giving it in Balls or Drenches, for he takes it with his Nourishment a little at a Time, and often; and accompanying the Food in its Passage through the Intestines, its Virtue goes into the Blood, together with the nutritive Part of the Food.

I have heard many who should know something better than the Vulgar, say that they would not cure a Horse of the Malanders if they could,

for

for that all that is prudent is to keep him from growing lame with them. They have an old Proverb that has mislead them from Father to Son for many Generations, which is, That curing the Malanders is shutting up the Wolf in the Sheep Cot. But they may be sure of this, not only in the present Case, but in all others whatever, that there will be no Danger or Damage in curing any outward Disorder, when the Blood is at the same Time rectified within.

We have shewn the Difference already, that when the Complaint is only external, outward Remedies alone may be trusted, but when the Blood is affected inward Things must be given to assist. The Danger even of a Mistake in these Cases, is not so great as these Persons apprehend; for when the Blood is in Fault, and no Care has been taken to amend it in the Cure, the common Consequence is only, that it breaks out again.



C H A P. XVIII.

For Over-weariness.

WHEN a Horse has been inconsiderately rode or worked; and no right Care taken to recruit Nature by good Food or Rest, he will be jaded, poor, dispirited, and ill-looking; and in wrong Hands may be utterly lost or spoiled. In this Case he will not eat at all, or not enough; or when he is brought to that his Food will do him little Service. In this Exigence Recourse must be had to Medicines, before he will have any real Benefit from his Provender; and what I have found to answer this Purpose, better than any other Preparation, is the following Drench. Mix in half a Pint of white Wine half an Ounce of Venice Treacle, and half a Dram of Powder of Saffron; give him this every Night for four Times. It will warm and strengthen Nature in every Part; he will recruit in Strength and Spirit during the Night, and rising in the Morning from a good Rest he will eat freely and heartily.

He must have choice Food, clean soft Water, and gentle Exercise, and less than a Week will recover him.



C H A P. XIX.

For inward Heat.

IT may always be perceived that a Horse is out of Order by his own Uneasiness. If he be restless and faint, without any seeming Cause, and if, upon putting a Hand in his Mouth, his Breath is found to be hot, and his Palate and Tongue inflamed, give him the following.

Mix together a Pint of new Milk, two Ounces of Honey, three Ounces of sweet Oil, and half a Scruple of Salt Prunella. Give him this every Morning, and keep him an Hour after without Food, repeat it till he is recovered. Three Doses usually perfect the Business, if not he may take more.



C H A P. XX.

For a scurfy Skin.

ALL Creatures are liable to Foulness of the Skin, when they are not taken good Care of: this is sometimes attended with other Disorders, sometimes not.

When there is no other Complaint joined with it, the Remedies are to be only external. Then proceed as follows.

Make some very strong Soap Suds, and put in some Vinegar, and some Powder of white Hellebore.

First clean the Horse well dry; then rub him all over with a Brush, wet with the Soap Suds, and then wash him all over with the same, by throwing some over him, working it in with the Hands and rubbing with a coarse Cloath.

After this let him be taken in and dried thoroughly, and give him some Food and clean Litter.

Mix up a Pound of Flower of Brimstone, a quarter of a Pint of Oil of Turpentine, and as much Hog's Lard as will make the whole into an Ointment. Rub him well with this an Hour after he is thoroughly dry from the washing.

The next Day boil a quarter of a Pound of white Hellebore, and a Pound of Dock Root, in a Gallon and half of Water. Make this into Suds, by beating it up with a good Quantity of Soap, and wash him with it. Then anoint him well with the same Ointment, as before.

Repeat this every Day for seven, eight, or nine Days, according to the Nature of the Complaint, and he will be cured: last of all wash him well with the Suds, without anointing him after it.

This is certain to prove a Cure, if there be nothing but the outward Complaint: but when it has proceeded from bad Food, bad Water, and ill Management, as well as Uncleanliness, then the same outward Method is to be used; and he is to have Flower of Brimstone and Powder of Antimony inwardly, as we ordered in the last Receipt.

There is no Need to alter the Medicines when the Design is the same, and there is no Way so good of giving them. All External Foulnesses are to be cured with Ease and Certainty; and in a very little Time in this Manner.



C H A P. XXI.

For sore Heels.

SET on an Earthen Pipkin, with a Quart of fresh Urine. Put to this an Ounce of Roman Vitriol, and four Ounces of green Copperas, let these melt, and then put in the Gall of an Ox, and a quarter of an Ounce of Oil of Vitriol. Rub the sore Part gently with this every Morning and Night till it is well.

Then wash it very clean with Soap Suds, and keep it clean from time to time for Fear of a Return.

If there be a great Running from the Part
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after the first two Days, put in a quarter of a Pound of Alum to the Liquor.

For a Cold caught at Grass.

This is not dangerous in itself, but ill Management may bring it to be fixed, and to have the worst Consequence. Timely Care soon remedies it; and the proper Course is this. Set on a Pipkin with a Pint of Ale, and half an Ounce of Liquorice Juice, commonly called Spanish Liquorice. Stir it about, and when the Liquorice is thoroughly dissolved take the Horse up, and give it to him early in the Morning: ride him half an Hour softly after this; and then turn him out.

Repeat this every Day till he is cured, which is generally in a Week.

***** C H A P. XXII.

For the Cholick.

THE Horses which are kept with great Care are less subject to the Cholick than others; but none are exempt from it entirely: it is a very common Complaint in the Farmer's Stable; and when it is not properly managed in Time will frequently be attended with very bad Consequences.

The most usual Cause of this Disorder is the feeding upon coarse green Food: let the Farmer therefore, when he perceives this Disease coming on, change the Food of the Horse; and give him some warm Bran and Water, with a few Drops of Oil of Juniper.

Often this alone proves a perfect Remedy; but when it does not answer Expectation let the Farmer lose no Time, but give him the following Glyster.

Boil two Handfulls of Mallow Leaves, Stralks, and Roots together in three Quarts of Water, till it comes to two Quarts, then strain it off. Set on the clear Water again, with a quarter of a Pound of Caraway Seeds; and a quarter of a Pound of brown Sugar, let it boil up two or three Times, then strain it off, and add to it a quarter of a Pint of sweet Oil, and a Spoonful of Oil of Turpentine. Let this be given as a Glyster and walk him after it.

Two Hours after this is come away give him three Drams of Philonium Romanum, dissolved in a Pint of warm Water, as a Drench. This very seldom fails.

If it does not answer by the next Morning repeat the Dose. Keep him from bad Food, and give him warm Water with some Bran to drink, and he will perfectly recover.

~~~~~ C H A P. XXIII.

For the Convulsions in the Bowels.

THIS is a Name by which the Farriers and others concerned in Horses express a Degree of the Cholick much worse than the preceding, and often very dangerous.

The Farmer will know it by these Signs. The

Horse stretches out his Legs, his Neck, and his Belly at Times; he rubs himself against the Walls; stamps upon the Ground violently with his Feet; and lies down and gets up again many Times together. His Belly looks swelled; and in the Beginning of the Disorder his Mouth is very hot; afterwards it is cold; and then he is in great Danger.

First bleed him moderately; then give him the same Glyster as last directed, only adding to it a quarter of a Pint of Gin.

Dissolve one Dram of Philonium Romanum, in half a Pint of Mountain Wine: add to this a quarter of a Pint of sweet Oil, and two Tea Spoonfuls of Spirit of Hartshorn, give him this as a Drench; and ride him or walk him softly after it.

If this does not answer in three Hours. Grate a couple of Nutmegs, put them into a quarter of a Pint of Gin: add a quarter of a Pint of sweet Oil, and one Dram of Powder of Saffron.

Give him this and walk him softly.

If there be no Amendment repeat the Glyster.

Then give him these two Drenches alternately once in four Hours, till he is well. I have seen more than one Horse lost by this Disease for want of Care, but never knew this fail.

***** C H A P. XXIV.

For Cracks about the Feet.

WHEN this Disorder is taken in the Beginning, it may be very well cured by the Method we have already directed for the Cure of sore Heels; but when it comes to an inveterate Height, and the Cracks are deep, and their Edges hard, it is to be treated in a different Manner, and great Care must be taken or there will be no sound Cure.

To this Purpose, boil together a good Quantity of Marshmallow Roots and Bran in some Water, and straining this off beat it up to a thick Lather with Soap. Let the Heels all about the Cracks be thoroughly soaked and washed with this: and then dry them.

Make the following Ointment. Set on an Earthen Pipkin with a quarter of a Pound of Hog's Lard, and the same Quantity of Venice Turpentine. When they are melted throw in half an Ounce of Bees-wax sliced thin, and when that is melted dust in half an Ounce of powdered Verdigrease. Stir it all very well together; and when it is mixed take it from the Fire, and stir it now and then till it is cold, that the whole may unite thoroughly.

When the Heels are dry from the washing, anoint them very thoroughly and very carefully with this, both on the Edges and within: then spread some of it upon Leather, and wrap round the Heels. Let this be kept on by tying; and not removed till the next Morning: then let the whole Dressing be repeated as at first, washing, anointing, and covering them up. Let this be repeated every Day, and there will be a speedy Amendment, and in some Time a lasting Cure.

C H A P.

CHAP. XXV.

For swelled Heels.

THIS is an Accident to which many Horses are liable that are kept in Stables, when they have no other Complaint whatsoever. Bleeding is serviceable, and it is no Way so well performed as by Leeches upon the Part.

For this Purpose there is no Need of that Trouble that is taken in bleeding our own Species this Way, for Nature will teach the Leeches to do it. In a Morning let the Horse be led into a Pond that is shallow, and has a good many of them in it. Let him be kept standing there some little Time, and there will a good many of them fasten on him of themselves. There let them take their Chance: they will presently make a good Bleeding, and the Horse will soon recover without any farther Trouble or Concern.

CHAP. XXVI.

For a Strain.

DISSOLVE two Ounces of Castile Soap in as much Spirit of Wine as will do to melt it: the Soap must be cut into thin Slices, and put into a Jar with the Spirit of Wine, and set in a warm Place. When this is dissolved put in Half an Ounce of Camphire; that will melt presently, and then the whole will be fit for Use: it is a Kind of Opodeldock, and will answer all its Purposes. Let the strained Part be rubbed with it very well with a warm Hand every Night and Morning, till the Cure is compleated.

CHAP. XXVII.

For running Eyes.

THE Eyes of Horses are the Seat of many Distempers; some of them very difficult to be removed, and some requiring the manual Operation of the Farrier: but there are others less violent, that yet are troublesome; and may, if not taken into timely Consideration, grow to Danger: this of Running is one of those, which may always be cured by the timely Use of the following Water.

Take four Handfuls of Ground-Ivy, cut it small, and then beat it in a Marble Mortar.

Boil six Eggs hard, chop the White to Pieces and put to the Ground-Ivy, then beat them again.

Then put in Half a Pint of Mountain-Wine, and a Quarter of a Pint of Rose-Water; and add an Ounce and Half of White Vitriol, and the same Quantity of White Sugar Candy first beat to Powder in another Mortar. Beat all these well together, and then put them into an earthen Pan. Strew some Basket Salt, about an Ounce, over them, and covering the Pan set it in a Cellar to remain six Hours.

Then make a Bag of thin Flannel like a Jelly-Bag, hang it up and set a Pan under it. Pour in all that is in the Pan, and there let it remain till the whole Liquor is gone through without squeezing.

Put this up in a Bottle, and every Morning and Evening drop some of it into the Horse's Eyes, and rub them gently with it, dipping the End of a soft Feather into it for that Purpose. In a few Days it will make a Cure.

CHAP. XXVIII.

For a Film growing on the Eyes.

BOIL an Egg hard, separate the Yolk and chop the White to Pieces. Mix with it some Basket Salt, and put it into the Shell of another Egg that can be kept whole, and set it over the Fire. Let it stand till it will come to a Powder.

Mix this with two Ounces of Honey and three Grains of White Vitriol in Powder. Put this a little at a Time into the Eye with a Feather, and it will often make a perfect Cure.

This must be done as soon as the Disease shews itself; for it is not to be depended upon afterwards.

CHAP. XXIX.

For Cramps.

HORSES are subject to Cramps as well as we; and they are very painful. They are discovered by the Creature's Uneasiness, and by the drawing up of his Limbs: the Cure is this.

Put into a large Bottle a Pint and Half of Vinegar and a Pint of Oil; shake them well together; then wet a Woollen Cloth well with them and wrap it round the Limb. If the Cramp do not go off before this is dry, repeat the same Thing, wetting the Cloth well again, and it rarely fails to compleat the Cure.

CHAP. XXX.

For the Anticor.

THIS is a Pain in the Breast of a Horse, often very troublesome, and frequently the Fore-runner of Danger. It rises from the eating too great a Quantity of rich fresh Food: as when a Horse has been turned loose at once into a Clover Field and left to himself, or the like: the Cure is this.

First bleed him moderately; and then give him the Aloe Purge we have before directed. If he is not much better let him be blooded again the Day after, and the Purge repeated, as there may be Occasion, and all the Time let him have moderate wholesome Diet, and some Exercise.

This Disorder in Horses is very like a Surfeit in our own Species, and is to be cured in the same Manner: nothing is required but cooling and

and opening the Body: and if it be not done the Disorder will gather Strength, and much worse will follow.

The Farmer will easily know by the Horse's going, and his Motions of various Kinds, whether he is growing worse or better after the first Dose and the first Bleeding. If he faulter in his Legs, and have a Stiffness in his Neck that he can scarce bow it down, all is going wrong: if he take frequent Tremblings, it is worse: the Bleeding must then be repeated immediately, and the Purge be given every other Day till he is well. The Quantity of Blood lost at two, three, or four Bleedings upon such an Occasion, will never do the Creature any Harm; and the Cure entirely depends on it.



C H A P. XXXI.

For Sickness at the Stomach.

THIS Disorder is usually owing to a great deal of Provender; or to the eating fresh Meat too carelessly. I have seen a Horse from an over-feeding upon Clover cast up all he takes both of Food and Water; and in this Manner he will go on to his Destruction, if not timely remedied. The Cure is this.

Make a Quart of Ale hot, and dissolve in it Half an Ounce of Venice Treacle, a Quarter of an Ounce of Philonium Romanum, and a Dram of powdered Cinnamon. Give him this as a Drench; and if it stays upon his Stomach, give him an Hour afterwards a Feeding by Hand of small Bits of Bread, and a very little Lock of Hay between them. This will continue upon his Stomach, and he will recover.

If the Drench did not stay upon his Stomach, give him the following. Heat half a Pint of Red Port Wine with a Lump of Sugar: put into a Basin three Drams of Salt of Wormwood, squeeze in four Lemons, and stir it about till the Salt is dissolved: then when the Wine is boiling hot strain this to it, and give it him for a Drench. This will be sure to stay upon his Stomach, if the other does not; and afterwards he is to be fed as before directed.



C H A P. XXXII.

For the Yellows.

THIS is a Disorder arising from an overflowing of the Gall, and it may be called the Jaundice in Horses; for it arises from the same Cause as that Disease in our own Species; and is to be cured by the same Kind of Medicines.

This Disorder first shews itself by a Yellowness in the Whites of the Horse's Eyes. Then the Skin of the under Part of his upper Lip next to his fore Teeth is tinged yellow; and then he grows faint and unable to perform his Business. He will fall down as he is in the Stable, be covered with Sweat as he stands still, and often shiver.

In this Case beat in a Mortar a Hat Crown full of fresh Celandine; add to this four Ounces of Powder of Turmeric and a Pint of White Wine. When all is well beat together press out the Juice, and put to it in a large Bottle one Dram of Powder of Saffron, and the clear Juice of four Lemons. Shake all well together.

Bleed the Horse in the Neck moderately; and an Hour after give him for a Drench a Pint of hot Ale and a Quarter of a Pint of this Mixture. Let the same be repeated every Night and Morning till he is perfectly recovered; giving him moderate Exercise.



C H A P. XXXIII.

For the swelling of the Spleen.

THIS is a Disorder which renders a Horse feeble and untractable: he faints in the Stable, loaths his Food at some times, and snatches at it voraciously at others; and he is frequently looking to his left Side, lying down upon it, and rubbing it against any thing.

The Remedy for this is to be sought in the Fields: the Herb Agrimony is a certain Cure: but it must be taken for some Time. The Disorder rises from an Obstruction in the Spleen, according to its Name; and this Herb is a certain Cure for all Complaints of that Kind.

Gather a good Quantity of this Plant fresh out of the Fields, and cut off the tender Tops. Beat these in a Mortar, and add a little Sugar, make them into a Conserve, and set this by.

Then pound the rest of the Plant, and mix some Beer with it by Degrees as it is beating: and when it is all a Mash press out the Juice.

Roll up a Ball of the Conserve, and rubbing it over with Butter give it to the Horse in the Manner of a Pill. After it give him Half a Pint of the Juice pressed out as before directed and made warm.

Let this be repeated every Morning and Night; and give him moderate Food and good Exercise. He will not be able to bear the Exercise well at first, but he will do better daily; and by that it will be seen that he is growing well: the Course must be continued till he is quite recovered; which will be known by his leaving off rubbing and looking at his left Side.



C H A P. XXXIV.

For the Heat of Urine.

THIS is a Disorder in a Horse, the same with the Strangury in our own Species; but it is to be cured more easily if taken in Time. I have observed it very often in Autumn, and scarce at all any other Season of the Year; and I am convinced it is owing to certain Insects the Cattle of many Kinds eat at that Time, in cropping the young Shoots of Trees, Shrubs and Hedges.

Every one knows that the taking of the smallest Quantity of the Drug called Cantharides or Spanish

Spanish Flies, occasions a terrible Stoppage and Heat of Urine. Cantharides are a Kind of green Beetles found upon the Bushes in SPAIN; and we have the very same Kind, but smaller, in ENGLAND. They live among the young Shoots of Trees at that Season; and now and then are swallowed up by the Horses that crop them: in this Case a Heat of Urine comes on, and the Horse is in terrible Pain: the Part swells and inflames, and he is continually wanting to make-water, though he can make only a Drop or two. His Blood is enflamed at the same Time; and if due Care be not taken, the Consequences will be dangerous.

Chop to Pieces four Pounds of the Roots of Fennel, six Pounds of the Roots of Mallows, and two Pounds of the Roots of Parsly. Set them on to boil in a Copper with eight Gallons of Water, and put in three Pounds of French Barley. Let them boil heartily together for half an Hour, stirring them well about: then when the whole is a little cooled strain off the Liquor, and squeeze it hard from the Ingredients.

Give the Horse equal Quantities of this Liquor and Milk mixed together warm for his Drink; and let him drink as much of it and as often as he will.

The Heat of his Blood will make him thirsty, and the Quantity of this Liquor he swallows will soon be a Cure.

If the same Disorder happen at any other Time of the Year, and from any other Cause, this Medicine will also cure it.

C H A P. XXXV.

For Difficulty of Urine.

THIS is a Disorder the Farmer must be careful not to confound with the other; for they somewhat resemble one another; though they have different Causes, and require a different Method of Cure.

The former is an Inflammation of the urinary Parts; but this is only an Obstruction by Gravel.

It is seen by the Creature's straining very hard to void his Urine, and often without being able to make any. In this Case let the Part be examined; and if there be no Heat or Inflammation, it is a Sign this is the Case. Also if the Disease be of more Continuance; and if the Horse can sometimes void a great deal. All these are Signs it is an Obstruction, and not an Inflammation; and the Farmer being sure of this by the Symptoms is to proceed thus.

Let him boil a large Quantity of French Barley in Water, and mix the Liquor with all the Water he drinks; and let him give every Morning the following Drench. Take Juice of Arsinart and Parsley-pert, of each a quarter of a Pint; Sweet Oil six Spoonfuls, and Oil of Turpentine half a Spoonful; give it warm, and an Hour after let him drink plentifully.

C H A P. XXXVI.

For bloody Urine.

THIS is a Disorder that shews itself very evidently; so there can be no Mistake of its Nature.

It is generally owing to over-working; and this will ofteneft be the Consequence, when with a great deal of Work the Creature is fed poorly.

The Remedy is this.

Bruise a large Quantity of that wild Cranebill, which is called Herb Robert: squeeze out the Juice, and add to every Pint of it half a Dram of Alum powdered, and two Drams of Dragons Blood. Give half a Pint twice a Day till he is well.

C H A P. XXXVII.

For the Vives.

THIS Disorder is a Swelling in the Kernels, between the Chop and the Neck of a Horse. It generally proceeds from Cold; and when it is attended with much Inflammation may be dangerous. The Remedy is this.

Bleed him largely, and pour into his Ears Juice of Rue mixed with a good Quantity of Pepper. Tie the Ears round to keep it in; and if he be not better the next Day repeat the Bleeding, and afterwards give him the common Purge set down before.

C H A P. XXXVIII.

For Soreness in the Nostrils.

THIS is a Disorder that is very troublesome to Horses kept at Grass; and they are found to be most subject to it which are fed in low wet Grounds. It is to be cured by an outward Application in this Manner.

Bruise some Plantain and press out the Juice. To a Pint of this put a Pint and a Quarter of Vinegar, and two Drams of Alum. Mix all very well together; and first wash the Part clean: then anoint and rub it gently with this Liquor. Repeat this every Day once or twice; and if it do not take speedy Effect put in more of the Alum: according to the Nature of the Disorder more or less will be required; but this is generally sufficient.

C H A P. XXXIX.

For bleeding at the Nose.

THIS is an Accident to which Horses are liable, in the same Manner as our own Species; but it is usually much more violent in them than in us. It is to be treated according to the Degree of it in a different Manner.

If it be very violent the Horse must be immediately blooded in the Flank, and while he is bleeding the following Mixture is to be prepared. Bruise in a Mortar equal Quantities of Clown's Allheal, and Wood Betony, add to it a little Salt, a little Allum, and some Colcothar of Vitriol; when all is beat together thrust some of it up the Nostril that bleeds, and keep it firmly to the Place till it is stopped.

As there may be Danger of its breaking out again in the Night, there should be a Quantity of the same Mixture thrust up in the Evening, and by Means of a Bandage properly made, it should be kept in.

When the Occasion is less violent the Bleeding may be trusted alone; and when most slight of all the Herbs pounded without any Addition will answer the Purpose.

CHAP. XL.

Of Disorders of the Mouth.

A Horse is subject to various Disorders of the Mouth, which are known by different Names, and some of these require the Hand of the Farrier; but the greater Part may be cured by the Farmer himself.

The Growth of bad Flesh over the Gums, which is called the Lmapass, is to be remedied by burning with a red hot Iron, and for this the Smith or Farrier is fittest, because Practice is the best Director. But for those Cracks and Warts in the Palate, and all the little Pustules and Inflammations to which it is liable, the Remedy is this. Gather a good Quantity of fresh Leaves of Wormwood, stamp them and press out the Juice, mix an equal Part of this and of Ægyptian Ointment, and stir these well together; then, with a Piece of Rag tied to the End of the Scuer, rub over the several Parts that are sore, and they will be cured in a few Times dressing. Swellings under the Tongue, are cured in this Manner.

CHAP. XLI.

For loose Teeth.

IT sometimes happens that the Teeth of a Horse will be sore, so that he cannot chew his Meat, and at Times they will be loose; these are great Inconveniences, and must be remedied so far as may be, as soon as they are perceived. For this Soreness in the Teeth use the following Wash.

Gather some Leaves of Wood Betony, and boil them in Ale till it be very strong of them: then strain it off, and mix with it an equal Quantity of the sharpest Vinegar. Heat this as hot as can be well borne, and wash the Gums about the Roots of the Teeth with it every Night and Morning; at the same Time feed the Horse for some Days with the softest Food that may be, and then leave him to his common Life again.

This generally proves a Remedy for Soreness

of the Gums; but when the Teeth come to be loose the Case is much worse. In this Situation after the Gums have been well washed with the Liquor before directed, bring in some fresh Leaves of Elecampane, and rub the Teeth and Gums with them: sometimes this will take Effect. Let the Horse be blooded, and let him be fed for some Days with soft Meat; as boiled Oats, and the like Things: for the not forcing them is a very great Article in the Cure.

CHAP. XLII.

For Foundring.

EVERY one who is at all accustomed to Horses knows this terrible Complaint. The Cause of it is commonly hard Service and bad Management; from these joined together the Creature gets a Disorder in the Feet, so that he is hardly able to stand upon them. He will quake and totter; and will be scarce able to keep up in going.

This is the Nature of foundering; and the Farmer should have a particular Care of those Things which occasion it. The setting up a Horse when very hot in a cold Stable without Litter is one Cause. The riding him into shallow Water, and letting him stand with his Feet under it a considerable Time when very hot, is another; and many other careless Tricks of the same Kind may have a like Effect.

But besides these there are other Accidents that will occasion it: as the wearing strait Shoes, and travelling a great deal upon very rough and hard Ground.

Sometimes a Horse is foundered on all his Feet, which commonly happens from the standing in Water when hot, or some such Accident; but more usually he is foundered only on his fore Feet: sometimes the Foundering is only on the hinder Feet; but this is much less common.

When he is foundered on the fore Feet he rests upon the hinder ones as much as possible, and is careful how the fore Feet go to the Ground: and in the same Manner, when the hinder Feet are affected, he rests himself almost entirely on the fore; not letting them come down hard at any Time. This Complaint is also known by his seeming weak behind as he goes.

The Method of Cure is this. Let the Horse be taken to a careful Farrier as can be found, and let the Owner stand over him to see his Operations. He is to pare away the Hoof gently till he comes to the Quick, and then to bleed the Foot in four or five Places at what they call the Toes. This being done, put into an earthen Pipkin equal Quantities of Tallow and yellow Rosin; let them melt together perfectly: then lay on a Quantity of this upon every Part whence the Blood came.

This done, let hollow Shoes be put on; and let another Pipkin be set on with equal Quantities of Tallow and Tar; when these are well melted together put in some Bran, and stir all again. Then make this very hot, and stop the Hollows of the Shoes with this.

Let this be repeated every Day for eight Days, during which Time keep him quiet and give him moderate Food.

After

After this bring him to more Exercise by Degrees.

Sometimes this Method will make a Cure, but not always; for there are Stages of this Disorder which nothing can relieve.

C H A P. XLIII.

For Wind-Galls.

WIND-GALLS are a Disorder of the Feet, brought on by travelling long together in hard Ways. They are little soft Swellings containing a Kind of Jelly, and appearing on each Side of the Fetlocks. The Remedy is very short and easy. They must be opened to let out the Matter, and then dressed with a Piece of black Pitch spread upon Leather, by Way of Plaster.

The common Practice is to prick them with a Nail, or some such Thing; and this is directed in those Books which treat of these Complaints: but this is a very injudicious Practice. Let the Farmer in all these Cases follow the Practice of the Surgeons; for the Business to be done is just of the same Nature, and they have best studied how to perform it. When they are called to open a Swelling, they do not perform this by pricking it, or making a small Hole for the Matter to come out; but they cut it with their Lancet all the Length; and sometimes again cross-wise: this lets out all the Matter, and gives the Dressing its full Power. In the same Manner in these Wind-Galls, and all Complaints of the like Nature, let the Farmer open the Swelling from Top to the Bottom; and when the Matter is fully and entirely out then put on the Dressing. In this Case the whole Malady is remedied at once; for the Horse is well by that Time the Plaisters come off, which they will of themselves in a few Days.

I have heard Farmers complain of these Wind-Galls returning again and again after pricking; and in this Case they will disorder the Feet of a Horse at length to his Destruction; but it is all owing to this Method of pricking instead of lancing: in that Case all being cleared there is no Fear of a Return; but when the Swelling is only pricked a Part of the Matter is left behind; the Hole presently fills up, and then there is a fresh Gathering; and this as often as it is discharged in that wrong Manner.

C H A P. XLIV.

Of the Anbury.

THIS is a Kind of Swelling or Pustule, that appears like a bloody Wart upon different Parts of the Body of a Horse, and is owing to Accident, without any Distemperature in the Blood. The Cure is this.

Bruise some Plantain Leaves, and press out their Juice. Mix together three Spoonfuls of this, three of Vinegar, and two of Honey; and stir in half an Ounce of powdered Allum. Burn down the Wart with a red hot Iron, close and even to the Body; and then anoint it with some

of this Mixture. Repeat this anointing Night and Morning till it is well; and it will never return.

This is a sure Method when there is no Disorder in the Blood; but as this Distemper is sometimes attended with a bad State of the whole Mass, a further Caution is then necessary. The Farmer may be satisfied nothing more is amiss, if the Anbury is perfectly and soon cured by this Method, and does not appear again in other Places, and if the Horse appear clean and healthy: but if the Complaint rises in one Place, when it is cured in another; and especially if at the same Time the Creature be gross, full of foul Humours, and have other Disorders upon the Skin, then there must be Care taken of the whole Mass, as well as of these single Eruptions.

In this Case let the Horse be first blooded; then let the several Anburies be burnt down and dressed in the Manner we have directed, and let there be Flower of Brimstone and crude Antimony in Powder sprinkled amongst all his Food.

During this let the Owner watch the Appearance of others breaking out; and always burn them down as they come. By this Method there will be a perfect and lasting Cure.

C H A P. XLV.

For a general Decay.

Sometimes a Horse will fall into a general Decay, without any apparent Cause: he will be weak and faint, and his Coat will grow rough, and he will lose his Flesh till he seem dying and irrecoverable. This is to be remedy'd, if taken in Time, by the following Medicine:

Take six Pounds of fine Wheat Flour, mix with it two Ounces of Aniseeds in Powder, and three quarters of an Ounce of Cummin in Seed, also powdered; Seeds of Carthamus powdered, a Dram and half; Fenugreek-Seed an Ounce and half; Flour of Brimstone two Ounces, Powder of Vipers three Ounces, Powder of Saffron one Dram, and Powder of Cochineal a Dram and half.

Mix all these Powders perfectly together, stirring them about; and then put to them a Pint of Sallad Oil, a Pound and half of Honey, and two Quarts of White Wine.

Work all this into a Paste with the Hands, adding a little Flour, if it be too soft, and a little Wine, if it be too hard: when it is well wrought, make it up into Balls of the Bigness of a Man's Fist; and give the Horse one of these every Morning in the Water he is to drink, and the same every Evening.

Let the Water be cold, and if he dislike it, give him no other. When he is thirsty he will take to it; and the getting him once to drink it is all the Difficulty, for he will afterwards like it better than any other. In this Manner he will be perfectly cured in three Weeks; and will recover his best Looks, Flesh and Spirit. Care is to be taken that he be kept, during the Time, upon good Food, and have gentle Exercise, but never to fatigue him; and that he lie clean and dry.

BOOK XIII. SECT. II.
Of COWS and OXEN.

CHAP.

1. Of the Fever.
2. Of binding of the Body.
3. Of Loosenesses in general.
4. For a common Looseness.
5. For a Looseness with sharp Stools.
6. For a Looseness with bloody Stools.
7. For a Looseness with great Heat of Body.
8. For the Obstruction of the Liver.
9. For bloody Urine.
10. For a Running at the Nose.
11. For Worms.

CHAP.

12. For Worms in the Tail.
13. For Boils on the Flesh.
14. For Disorders of the Lungs.
15. For a Foulness of the Skin.
16. For falling of the Palate.
17. Of Hurts in the Feet.
18. Of the Panting Evil.
19. Of the Yellowws.
20. Of the Gargil.
21. Of the Garget.
22. Of the Murrain.

The INTRODUCTION:

THESE Creatures are not liable to so many Disorders as the Horse; but there is nothing of greater Importance to the Farmer than a right Knowledge of those to which they are subject, and the best Methods of curing them. A distempered Cow or Ox are worth very little. Most of their Diseases, as they are of a more simple Nature than those of the Horse, are easier of Cure: but there are some which we see mock all the Art of Physic, and all the Rewards a Government can propose for devising a Remedy: The fatal Disorder that has now raged so many Years is a terrible Instance. No Medicines yet discovered are able to cure, nor any Regulations to put a Stop to it.

We have examined this Matter with all the Attention the Nature of so weighty an Affair demands; and hope we shall be able to propose something on that Head worthy the Attention of the Farmer and of the Public. We shall begin with Diseases of a less terrible kind, that the Husbandman may be led, by Degrees, to the most important and difficult.

CHAP. I.

For the Fever.

THE Farmers find their Cows and Oxen subject, like themselves, to Fevers; and these, though they generally will go off kindly by Assistance, often are of very bad Consequence when neglected. The most common Occasion of them is a Surfeit, and sometimes they will seize them, as ourselves are seized by Sickness, without any visible Cause.

The Signs are these: The Creature foams at the Mouth and hangs down the Head; the Eyes look heavy, and the whole Body trembles: and it frequently groans very mournfully and heavily. It is hot and restless, and does not care for Food, but is continually desiring to drink. These are the genuine Signs of Fevers in Cattle.

The Farmer must take Care that he confound them not with the Symptoms of other Diseases, for this is the general Mistake. Let him remember, that as these are the proper Signs of a Fever, so there are no other but these that are to be considered plainly as such.

Many other Disorders will have the Symptoms of a Fever joined with those that are peculiar to themselves; and, in that Case, the Farmer is to be upon his Guard accordingly: he must first distinguish the Disease truly, or all Advice and all Knowledge of Remedies will be fruitless.

In Cattle, as in ourselves, many, nay most other Disorders, are attended with a Fever; therefore it is natural that feverish Symptoms appear with them: hence let the Farmer, when he sees these Signs here described, in a Creature of this Kind, first examine whether there be not, together with them, some belonging to those Disorders, we shall describe in the succeeding Pages: if there be, then he is to level his Remedies at the Disease they indicate; those Signs of a Fever being symptomatic: and as the other Disorder is the real Cause of them, when that is removed they will go off.

This is the Conduct he is to observe when there are the Signs of a Fever, and those of some other Disease together; but when there are those of a Fever only, that is, those we have here described, and no other, he will find the following Method of Cure generally successful.

First bleed the Creature: and as to the Quantity, that is to be guided not only by the Nature of the Disorder, but by the Condition of the Body: if it be a very violent Fever, more Blood is to be taken away; if less violent, less: and if it be an Ox, he may be blooded much more freely than a Milch Cow. A Quart of Blood may be very properly drawn from the former; but it is a general and very wise Rule, that there never should be more than a Pint taken from the latter. Though, if the Symptoms encrease, the Bleeding may be repeated after four and twenty Hours.

When the Creature has been blooded, set it up warm, and give it no Victuals.

Boil

Boil, in six or eight Gallons of Water, a Basket-full of Plantain-Leaves and Roots, and half a Dozen Handfuls of Agrimony, strain them off, and let the Creature drink of this, warm, as often as can be.

The next Day give a Quart of Ale, with half an Ounce of Venice Treacle in it; and repeat this once in eight Hours.

Give some very fresh Hay, sprinkled with cold Water, after all this; and, by Degrees, the Beast will grow well.

During all the Time of the Illness, the Lips must be frequently rubbed and cleaned, for they furr up and grow foul with the Heat of the Disorder; and unless this Care be taken, it will not eat or drink.

Let the Creature be kept up till perfectly recovered, and after that let it be taken some Care of several Days.



CHAP. II.

For binding of the Body.

THIS is a Distemper to which these Cattle are very little liable, for their natural Constitution is to be loose; but, for that Reason, when it does happen, it is to no Creature so dangerous, nor is there any Disorder in Cattle that requires so critical a Method of Cure.

If any of the common Purges that are used for Horses, be given to Cows and Oxen in this Case, they seldom fail to bring on a Disorder in the other Extreme, that is much worse than the first; and the Remedy grows worse than the Disease.

I have found from Experience that the following is a safe and excellent Medicine.

Take a Quarter of a Pound of coarse ordinary Manna, this Sort is to be bought for a fourth Part of the Price of the fine Kind, and yet for any Use it is better. Melt this in a Pint and a half of Ale, put it into a Bottle, and add to it half a Pint of Sweet Oil, and six Ounces of Lenitive Electuary. Shake all very well together, then pour out a Gill and half of it: warm this, and give it every Morning and Night till half the Quantity be taken; and then every Morning only till the Remainder is all taken. This never works as a Purge, but it gently produces the Effect, bringing the Creature's Body to a due State and Condition; and as this is brought on gradually, it is sure to continue. I never once knew a Relapse after this Cure.



CHAP. III.

Of Looseness in general.

THIS is a Disorder to which Cows and Oxen are much more liable than the former, the Condition of their Discharges naturally tending to it; and it is for that Reason difficult of Cure, if not taken in Time. When it first comes on, it affects them no other Way than by making the Discharge thinner, while it retains

Numb. I.VIII.

its natural Colour: after this it becomes paler and sharper, giving the Creature great Pain; and after that the Stools grow bloody.

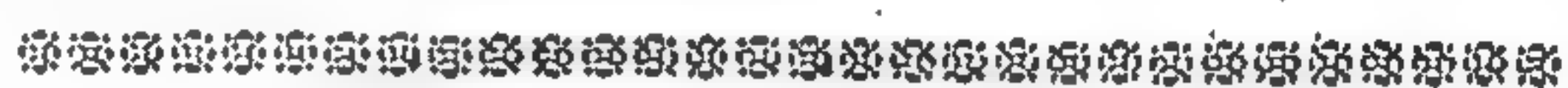
These are the true Stages of the Distemper. The Farmer is to regard them carefully, for there is to be a different Course of Medicines for each. We shall therefore, after this general Account of the Disorder, consider it under these three particular Heads, delivering the proper Remedies.



CHAP. IV.

For a common Looseness.

BOIL half a Pound of fresh Roots of Bistort in two Quarts of Water. Strain off the Liquor, and add to it four Ounces of Whiting, and an Ounce of Diascordium, made without Honey: give the Creature half a Pint of this, warm'd and well shook up, three Times in the four and twenty Hours, till the Complaint ceases. Sometimes a single Dose performs a Cure; but in that Case it will be proper to give another Dose, Morning and Night, for two Days, to prevent a Return.



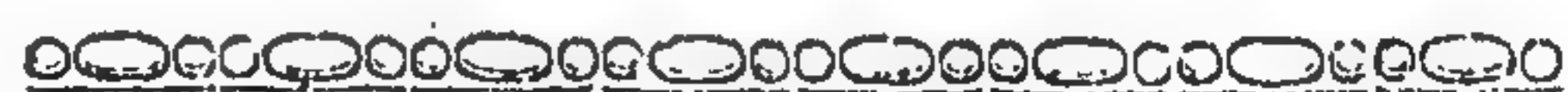
CHAP. V.

For a Looseness with sharp Stools.

IF the former Medicine have not stopped the Disorder; or if the Farmer have not observed it till it comes to the second Stage, that is, till the Creature's Stools are sharp and discoloured, then the following Remedy is to be used.

Bruise to a gross Powder half a Pound of the dry Root of Tormentill, and boil it in two Quarts of Water to a Quart.

Squeeze this off, add to it a Quart of rough Red Wine: add also a Quarter of a Pound of Whiting, two Ounces of Diascordium without Honey, and one Ounce of Japan Earth. Shake this very well together. Warm it every Time it is given, and let the Cow have half a Pint of it for a Dose, three Times a Day, till perfectly recovered.



CHAP. VI.

For a Looseness with bloody Stools.

THIS Disorder sometimes comes on at once; but more frequently it is the Consequence of Neglect, or wrong Medicines given for the others; or of the Violence of the Disorder, which sometimes will not be conquered by the very best.

The natural Course of the Disorder is this: a sharp Humour falls upon the Bowels; and the Stools are thin and cutting.

After a Time they wear off the slimy Coat of the Bowels, and then what comes away is discoloured; and after this they wear the very Insides of the Guts themselves, and then come

8 M

bloody

bloody Stools. This is the last and worst Stage of the Distemper, and it is very dangerous.

When it has arrived at this Degree, the following Method is to be taken :

First let the Creature be blooded, but not largely ; then prepare this Medicine.

Bruise to Pieces half a Pound of dry Roots of Tormentill, six Ounces of dry Pomegranate-Bark, and two Pounds of the Leaves and Roots of Plantain.

Boil these in three Quarts of Water to two. Then put in two Ounces of Cinnamon pounded : let it boil a few Minutes longer, and then take it off.

Set it by to be cold, and then strain it off : add to this three Ounces of Dragon's-Blood, in Powder, and a quarter of an Ounce of Roch-Allum.

Shake all thoroughly together ; and when it is to be given, warm the proper Quantity : this is to be about a Gill and half, and it should be given three Times a Day.

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C H A P. VII.

For Loosenesses with great Heat of Body.

WE have told the Farmer what are the Symptoms of a Fever in these Creatures ; and he is aware that they may happen with other Disorders. A Purging is one of those with which they may happen, and in that Case it is not to be treated as a Fever alone, neither is the Disorder to be considered only as a Purging : a due Regard is to be had to both ; and the following Medicine being founded on Reason, and supported by repeated Experience, I shall earnestly recommend for this Purpose to the Farmer.

Cut into Slices six Ounces of the Root of the Herb called Avens, or Herb Bennet. It is not sold at the Druggists nor at the Market, but it is common on Ditch-Banks. The Flower is little and yellow ; the Head is a small Burr ; and the Root smells like Cloves. Let this be boiled in three Quarts of Water to two Quarts, adding, toward the End of the Boiling, an Ounce of fine Cinnamon, and two Ounces of Chips of Logwood, such as is used by the Dyers.

Strain off this Liquor, and add to it an Ounce of Powder of Virginian Snake Root, and a Pint of Red Port Wine.

Give the Creature half a Pint, warm, twice in twenty-four Hours.

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C H A P. VIII.

For the Obstruction of the Liver.

THIS is a Disorder, to which Cows and Oxen are very liable ; the Farmers are acquainted very well with the Symptoms of it, though not with the Cause ; it is what they call by the general Name of an inward Sicknefs.

The Signs by which it is known are these ; an Uneasiness sensible in all their Actions ; and a Lazyness or Unwillingness to move. To this is to be added a Scurfyness, and harsh Dryness

of their Lips, and a Dryness of their Noses in a Morning.

This last is a very singular but very certain Symptom.

When these Cattle are well, if they be observed in a Morning, there is always a Drop of Dew, like a Pearl, hangs upon the Nose ; but when they are sick it is commonly wanting. No Disease sooner takes the Effect of getting off this Mark of Health, but it is not peculiar to this. If the other Symptoms shew that the Disorder is of that Kind, this joins with them to confirm it ; but if not, the Cause is to be sought farther. In Case of an Obstruction of the Liver, the Remedy is this :

Take a Pound of great Celandine, dug up with the Roots, cut it all to Pieces, Leaves, Stalks, and Roots together, and put it into a Pot, with two Gallons of Water, let it boil up a few Minutes ; then add half a Pound of Madder Root, ten Ounces of Turmeric, and four Ounces of fresh Roots of Fennel. Boil these very well, and then strain off the Liquor.

Get a Hat-Crown full of Wood-lice, they are common enough about decay'd Timber, and under Stones. Pound these with a Pint of White Wine, and squeeze out the Juice, then add this to the strained Liquor.

Shake this up every Time it is to be used, and warm half a Pint of it for a Dose. It should be given every Night and Morning for ten Days. This is the usual Time required to perform a perfect Cure : it may be sooner, or it may require a few Days longer ; but the Medicine will hardly fail.

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C H A P. IX.

Of bloody Urine.

THIS is a Disorder to which Cows are very liable, and, if not taken Care of in Time, it is a very fatal one. The Method of Cure is this :

Take the Cow into a warm House, where she is to be kept till cured.

Bleed her about three Quarters of a Pint, and then give the following Medicine :

Gather a Basket-full of that Sort of Cranes-bill, call'd Herb Robert. Stamp it in a Marble Mortar, and press out the Juice ; give the Cow a Quarter of a Pint of this every Morning and Night, and it generally will perform a Cure in about three Days.

It is a kind of Specific for the Disorder, and cures with surprizing Quickness : but there are some Cases in which other Disorders bring on this bloody Urine, and then this Medicine does not answer.

Let it be try'd only six or seven Doses, and if that do not succeed, have Recourse to the following.

Boil in a Gallon of Water a great Quantity of the same Herb Robert, and as much Shepherd's Purse. When they have boil'd well half an Hour, put in a good Stick of Cinnamon ; and after boiling a few Minutes longer, set it off the Fire. Then strain it and set it by to cool.

Dissolve

Diffolve in this two Drams of Sugar of Lead, and add one hundred Drops of Spirit of Vitriol.

Shake all well together, and give the Creature a Gill of it cold every four Hours, till the Cure is perfected.

CHAP. X.

For Running of the Nose.

THIS Disease which grows to such a terrible Height in Horses, under the Name of the Glanders, is very slight in Comparison of that, in these Cattle. It proceeds from Cold, and the Running is like that from our own Noses in a like Case; only as they hold their Heads down it is not so easily cur'd, and it will encrease upon them to a mischievous Disorder in Time, if not stopp'd.

Take the Creature up, and let it be kept warm.

Bleed it about a Pint, and then give the following:

Boil a Pint of Ale, and diffolve in it half an Ounce of Venice Treacle.

Give it warm, and let it be repeated every Night and Morning.

Give the Creature good Provender while under this Method of Cure; and during the taking of the Medicine use the following Application to the Part. Melt some fresh Butter; and stir in as much Flower of Brimstone as will make it a thick Ointment. Rub some of this all over a Couple of Goose Feathers, and warm them a little before the Fire; anoint the Inside of the Nostrils carefully, but thoroughly, every Morning and Evening with this, till the Disorder ceases entirely.

CHAP. XI.

For Worms.

COWS and Oxen are subject to have Worms bred in their Bowels, and they are greatly disordered by them; they will prevent their thriving, and make them restless and untractable. The Remedy is this:

Chop to Pieces some Savin-Tops, and Leaves of Bear's-foot, mix with these a little Salt of Steel, and work up the Whole into a Sort of Paste with Butter. Divide this into small Balls, and give one of them every Morning early for a Week or longer; keep the Creature without Meat three Hours after the Medicine, but let her drink as much as she chuses.

If this Medicine do not succeed alone, it must be assisted in the following Manner:

Diffolve half an Ounce of black Soap in a Quart of Sweet-wort, and give this every Morning after the Ball of Savin. In this Manner the Cure will usually be perfected in a few Days.

CHAP. XII.

Of Worms in the Tail.

BESIDE the Worms that breed within the Bodies of Cattle, there are a very troublesome and mischievous Kind that breed and live externally in the Tail.

They torment the Creatures out of their Lives, waste their Strength and Spirits, and keep them in continual pining. They usually grow lean; their Backs become weak; when they are lain down they are scarce able to get up again, and they have a Faintness in their Looks and Motions.

When the Farmer sees a Cow or Ox in this Condition, let him examine the under Parts of the Tail. He will first perceive that the Hair is fallen off; then that there are a multitude of little Sores; and, upon further Examination, he will perceive, that the Tail is almost eat asunder in several Places at the Joints.

This might seem to be a natural ulcerated State of the Tail; but it is, in Reality, owing to a Multitude of eating Worms, which will be found easily enough upon looking after them. They are occasioned by Foulness of the Tail, which tempts a particular Kind of Fly to lay its Eggs there; or, according to the common Expression, to blow it.

These Worms are hatched from the Eggs, and they live their Time in the Tail amidst these Sores; after which they drop off, and take their Chance upon the Ground, where, if not trodden to Pieces, they harden outwardly, and after a while, they come out a Fly, like the Parent Animal.

There never want a Succession of these Tormentors; for the Condition of the Tail draws more Flies to blow it, like Meat that begins to putrify, and thus the Disease continually encreases.

The Farmer thus understanding the Nature and Cause of the Disorder, will know how to guard against the Accident to which it is owing. And we shall next inform him of the Remedy.

It is only in Summer the Disorder takes its Rise; though, when once established, it will continue at all Seasons.

Therefore as Precaution is in all these Cases easier and better than a Cure, let him take Care in Time. We have told him that it is Foulness on the under Part of the Tail in Cows, that first brings the Flies to them. Nature has so dispos'd the Tail in this Creature, that it is very liable to be made foul. This is an Inconvenience, but it is attended with many Advantages; it is therefore the Business of the Farmer to remedy the Disadvantage, which is easy, that the Creature, and himself in Consequence, may reap the Benefit.

The Dung of the Cow and her Urine, will be apt to hang upon this under Side of the Tail; and after Calving, there will be also greater Inconveniences of the same Kind: therefore let a Person be employed, once in three or four Days, to clean the Tails of the Milch Cows, in

in particular in this Part, which will be very easy; and of the Oxen, as there may be Occasion. This will be very agreeable to the Creatures, and were there no other Advantage it would be worth while for this, because the more comfortable they are kept the better they thrive. But if this Care be taken there will be no such Thing as the Tail Worm known. Cleanliness will not only prevent the Disorder, but in the first Stages will cure it. The best Washing is performed by Means of a Brush and Soap Suds, and if a few of the Worms should be bred, this will perfectly destroy them. We shall hope the Farmer will take this Care, and he will need no farther Information; but as a Neglect of this may have happened, or the Disorder may have some Way got footing where he little expects, we shall here deliver also the Remedy.

Chuse out a Pound and half of fine fresh and new made Stone Lime. Boil a Gallon of Water, and pour it all at once upon the Lime in a very large Earthen Pan.

It will bubble up in a surprising Manner. Stir it well together, cover it up when cold, and let it stand all Night to settle; there will be a very strong Lime Water, though but a small Quantity of it. In the Morning let it be poured clear off, and kept for Use.

Take up the Cows that have the Disorder, and keep them dry and carefully while they are under Cure.

Make a very strong Lather of Soap Suds in soft Water; and first of all with Flannels, and afterwards with a Brush wetted in these Suds, wash the Tails in every Part perfectly clean; and the more to promote the perfect cleaning of them, cut off the Hair that remains as short as can be.

After the Tails have been thus cleaned and are dry, wash them in the same Manner with this strong Lime Water. Observe after four or five Days, whether the Disorder be cured; if not farther Methods must be taken. Once a Day will be enough to dress the Tails by these two Washings, but it must be every Time done in this careful Manner, first by the Soap Suds, and afterwards by the Lime Water. If these fail the following Method is to be used.

Stamp a good Quantity of the fresh Tops of Rue and Savin; when they are reduced to a Paste; add a little white Hellebore and Stone Ocre, both in Powder, and some Wood Soot and a little Salt. Beat all this up again, and then mix in some Butter. When this is ready, and the Tail perfectly cleaned, let it be slit along all the Way down the Inside, nearly to the Bone, and very thoroughly anointed with this.

If this does not cure in three or four Times, let the Tail be rub'd with a small Quantity of the common blue Ointment, made of Quick-silver, Venice Turpentine, and Hog's Lard.

These several Methods are to be tried one after another; usually the first succeeds, if not, the second rarely fails; but if none will do, the last Resource is to cut off the Tail. But it is best to fatten up the Beast after this for Sale directly.

CHAP. XIII.

For Boils on the Flesh.

COWS are subject sometimes naturally to large and painful Boils; and sometimes they fall into the same Misfortune in a surprising Manner, by Means of a Fly, as in the former Instance.

We shall consider these Cases separately.

When a Boil comes naturally on a Cow or Ox, the Thickness of the Skin, and the cold Constitution of the Animal make them ripen slowly, and they also heal slowly and difficultly afterwards. Nature is, in these Cases, to be assisted in the following Manner. For the ripening of a Boil: take up some white Lilly Roots, and boil them in Milk and Water till they are perfectly soft. Then lay them hot upon the Boil. Bind them on if that can be done conveniently, if not let a Person hold them on till they are cold.

This is to be repeated as Occasion requires; the oftener the better; and the Boil will ripen and come to a Head.

The opening of a Boil when it is in this proper Condition, may be done either by a Knife, or a red hot Iron, and the general Practice is by the latter Method.

When the Matter is discharged, which should be promoted by a Person's pressing it gently, let it be dressed with the following Ointment. Put into an Earthen Pipkin half a Pound of Tar, and three quarters of a Pound of Horse Turpentine; set it on a gentle Fire, and as it melts throw in a little Hog's Lard, about two Ounces will be sufficient. Stir all well together, and dress the Part every Day with some of this warm, till it is healed.

The other Accident of Boils occasioned by Flies, is much more wonderful than any thing relating to this Creature, and the Discovery of it was made by Mr. DE REAUMUR, of the Royal Academy of Sciences at PARIS, and is delivered in the fourth Volume of his Memoirs, very much at large. The very same Thing happens in ENGLAND, and what we see verifies his Accounts.

There is a large Fly that in Autumn teazes the Cattle prodigiously. It settles upon them, and lays its Eggs in a small Wound, that it makes for that Purpose in the Skin. These Eggs hatch in Time, and the Part swells with the Hurt. A Cow shall thus be covered with filthy Boils, while its Blood is in a perfect good State, and this Accident the only Cause of it. There is a Maggot in every one of these Boils, which feeds upon the Matter bred there till it is of full Growth, and then crawls out and takes its Chance for appearing in the Fly State, as we have shewn of the other.

There is no Need to suffer the Creature to be tormented in that Manner till the Maggot goes out of itself; but the Assistance of a careful Hand should be given to clear her of them at once.

Every one of these Boils or Lumps should be opened

opened with a sharp Knife; and the Maggot taken out and destroyed. The Wound is then to be dressed once or twice with the Ointment before directed, and the Creature will be perfectly freed from the Torment.

CHAP. XIV.

For Disorders of the Lungs.

THESE are of various Kinds in the Cow and Ox Kinds, as in ourselves, but Experience shews that one Remedy will serve for them all. Sometimes the Creature breathes with Difficulty, sometimes coughs and wheezes; and in either Case, or any other proceeding from the Lungs, give the following Medicine. Bruise four Heads of Garlick, and press out the Juice, mix this with a Quart of new Milk, and add a quarter of a Pint of Tar. This will serve for four Doses. One is to be given every Morning till the Cure is compleated. About four Doses usually answer the Purpose, but if more is required, the same Quantity is to be mixed up over again. The Tar does not mingle well with the rest, but these are not very nice Creatures, so it goes down.

If the Disorder be obstinate, and do not readily give Way to the Remedies, the Creature should be blooded, and they will then take Effect.

CHAP. XV.

For Foulnesses of the Skin.

CATTLE of this Species are cleanlier in their Hides than most others, but they are not altogether free from Blotches, Scurf, and Scales.

When these appear they must instantly be taken Care of, for the Beast can never thrive that has them.

First of all let the Cause be considered, which is often only want of Cleanliness, sometimes a Disorder in the Blood; and in some Cases it is owing to both together.

Foulness of Diet is the common Cause of this Disorder in the Blood; and this is usually occasioned by that Sort of rank Grass which grows in wet Places, and the Weeds among it.

Therefore to undertake the Cure rationally let the first Thing be a Change of Pasture. From a low Ground full of rank Weeds, and abounding with Mud, remove the Cattle to a high dry Piece of Pasture, where the Grass is very sweet, and the Soil gravelly or otherwise dry, so that there can be no Dirt for them.

If the Disorder be only owing to Uncleanliness, this Change alone will cure the Cattle.

If the Blood be concerned, this is also a very proper Method of assisting the Effect of Medicines.

Let the Creatures be blooded: about a Pint and half from the Ox, and half that Quantity from the Cow.

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Then let them be taken in and perfectly cleaned. Warm Soap Suds, a soft Brush and Flannels are the proper Remedies for this Foulness, or they are the needful Preparations for others.

When the Cattle have been perfectly cleaned, if any Scales remain let them be picked off; and the next Day let the Washing be repeated. This, and the Cleanness of the Pasture, will fully answer this first Purpose.

The next Day let the Creature be washed well over with the Lime Water, directed to be made in a former Chapter; and if any of the Scabs have grown to a Bigness since they were pick'd off, they must be rub'd again, that the Lime Water may get to the Root of the Disorder.

Let this be repeated three Times, at two Days Distance; and all the while let there be some Flower of Brimstone sprinkled among the Hay that is given them in a Morning. In this Manner their Blood will be sweetened, at the same Time that the outward Remedies perfectly cure the Disorder.

CHAP. XVI.

Of falling of the Palate.

THIS is a Disorder that frequently seizes upon Cattle after hard Labour and Colds, and is of a very troublesome Nature, if not provided against in Time.

When the Palate is first fallen it is not difficult to replace, and keep it up; but when it has been any Time down the Difficulty of putting it up, and the Readiness to fall again, are very great. I have known an Ox obliged to be killed when it was not intended, nor was he fit, because he would otherwise have been starved by the unconquerable Continuance and Relapses into this Disorder.

The Farmer will perceive that the Creature has this Disorder by his great Uneasiness, and a particular Kind of hollow Groaning: he will be continually striving to eat, but not able to swallow, and thus without Care he would go on till entirely starved.

The Remedy is this; cast the Creature, and getting the Hand into his Mouth replace the Palate as it should be: then rub over it some Honey and Pepper mixed together, and let him rise again: half an Hour afterwards bleed him a Pint and half or more; and thus the Complaint is commonly to be cured without any Danger of a Relapse.

He must not be fed with Hay, but for some Days only with fresh sweet Grass.

CHAP. XVII.

Of Hurts in the Feet.

WHEN a Cow or Ox is observed to limp, and keep one or more of his Feet from the Ground as much as he can, the Occasion usually is some Complaint about the Hoof, and nothing so common as a Soreness between the Cloves.

For this the Remedy is easy.

Cast him, and clean the Space between the Cloves perfectly well, rubbing it till it bleeds. In the same Manner clean all about the Foot.

Then chop a Quantity of the Leaves and Tops of Mugwort, boil them soft in Milk and Water, and put some in between the Cloves, and some about the whole Hoof, tie it on and let the Creature be kept quiet: the Cure is generally compleated at one Dressing.

Some accidental Foulness is oftener the Cause of this Complaint than any thing else; so that cleaning it, and laying on a soft healing Cataplasm in this Manner, is a very natural Remedy.

When the Case is worse, and there are actual Sores between the Hoofs, the best Method is to clean them as already directed, and then to dress them with a Quantity of Black Basilicon spread all over some Tow, and drawn in between the Cloves. This should be repeated every Day till the Cure is perfected.



C H A P. XVIII.

Of the panting Evil.

THIS is a Disorder that shews itself in the Creature's Faintness and Unwillingness to stir; in his frequent panting, and as it were sighing. It renders the Creature weak, and he generally wastes in Flesh.

The Remedy is this.

Boil a Quart of Ale and dissolve in it half an Ounce of Mithridate, and a Scruple of Powder of Saffron.

Give this warm every Morning for four Times; it very rarely fails to make a Cure. The Creature must be fed upon dry sweet Hay, and have his Drink warm during the Cure.



C H A P. XIX.

Of the Yellows.

THIS Disorder in Cattle is of the same Nature with the Jaundice in ourselves. It is perceived first by a Yellowness in the Eyes; and in the Lips; and the Creature is always lazy and weak. The Cure is this.

Bruise in a Marble Mortar a Basketful of great Calendine Roots, Leaves and Stalks together: add to this a good Handful of Rue, and then squeeze out the Juice.

Mix with this an equal Quantity of Juice of Wood Lice, and give the Beast a Gill and half of it every Morning, for about a Week; and afterwards every other Morning for a Week longer. In this Time the Cure is generally compleated, and there is no Danger of a Return of the Complaint.



C H A P. XX.

Of the Gargil.

THIS is a very terrible Disease, and more difficult of Cure than most others.

It is an external Swelling and Inflammation; but the Blood is always concerned; and the Disorder for that Reason spreads and defies all outward Remedies.

It appears at first in the lower Part of the Dewlap, in Form of a hard inflamed Lump, which spreads till it occupies the whole Dewlap, and reaches to the Throat, in which Case it is very often fatal.

This is the Disorder called the Gargil distinctly and properly considered. It affects the Dewlap and Throat only; and it is the first Step toward the most dangerous Disorders; but it is of a distinct Nature in itself, too often destroying the Cattle without encreasing to any greater Degree of Malignancy than this.

Farmers confound the Terms of Diseases, and Farriers more.

Authors who should write for their Information copy their Mistakes, and consequently tell them only what they knew before, confirming them in Error, not leading to Truth.

We are entering now upon a Point of vast Importance; and unless the first Steps be cleared of Perplexity and Confusion, the rest will never be understood.

The Gargil and Garget are treated by these Writers, as well as spoken of by Farmers and others, as the same Disorder, but this is the Distinction.

The Gargil is a Swelling in the Dewlap and Throat, extending no farther; the Garget is a Swelling of the Head and Eyes, with other external Parts, with Inflammation; and the Murrain is the same Swelling and Inflammation, extending itself also to the Inside of the Throat, the Stomach, and the Bowels.

This last is the Distemper now, and of many late Years so fatal among the horned Cattle, it becomes the Farmer to understand it in all its Progress; and if the Physicians who have written so much about it had descended from the Closet to the Cow-house, they would have found the same Facts; and knowing something of the Cause, they would have been more likely to have made a proper Judgment as to the Method of Cure.

The State of the three Distempers is this. The Gargil can never change to the Garget; and if ever it seems to do so, it is that the Farmer has observed the Throat more than the Head and Eyes, when they have been also affected, and the Disorder has been the Garget all the Time, while he took it for the Gargil.

The Gargil may very naturally, and very frequently does change into the Murrain; but the Murrain may begin of itself without it.

That is, a Swelling of the outer Parts of the Head and Neck, which is the Garget, may spread inwards, and so be converted into a Murrain; or the Inflammation and Swelling may begin in the inner Parts, and then it is most dan-

dangerous, because least seen; and is most infectious because the Breath conveys it to all those which have their Heads near: this is the Murrain appearing in its proper Form; and this is of all the most fatal.

The Reader will thus understand the several Stages of the Disorder among the horned Cattle, and thus perceive what is best to be done for preventing the Infection.

Having thus, from the first Origin, traced its several Degrees and Appearances, we shall now deliver the Method of Cure for this, which is but a Resemblance, not an absolute Degree of it.

As soon as the Gargil is perceived let the following Ointment be prepared. Melt together equal Parts of Pitch and Turpentine, and add a small Quantity of Bees Wax. Let this be in Readiness.

Slit open the Dewlap for three Inches in Length where the Swelling is, and let it bleed freely.

Bruise in a Marble Mortar a Handful of the Leaves of the great black Hellebore, and add to them some Hog's Lard: beat the whole up, and thrust in a good Quantity into the Slit. Sow up the Wound to keep in the Ointment, and keep the Creature clean, warm and quiet for two Days.

Then open the Stitches, take out the Remains of the Hellebore, and melt some of the Ointment just directed to be made: dip a large Pledget of Tow in this, and put it into the Wound hot. Repeat this Dressing every Day till the Wound heals.

This generally proves a Remedy for the Gargil, when it is not of a very violent Kind; and when it is, scarce any Thing will be found effectual. The Addition of equal Parts of Gum Elemi and a few Grains of Euphorbium to the Ointment, is the best that can be done.

Let the Farmer first take Care that he distinguishes that it is really the Gargil, and nothing more that ails the Beast; and then he will need to do no more than this.

C H A P. XXI.

Of the Garget.

THE Garget commonly confounded with the former in Name, as the Words much resemble one another, is in Effect a quite different Disease. It is as we have observed in itself very terrible; and it is the first Stage often of that dreadful Disease, under which our Cattle now suffer.

The Garget is a Disorder of the outward Parts of the Head, which is attended with Swelling and Inflammation; which frequently spreads into the Mouth, and sometimes into the Throat and down to the Intestines. In this last Case it is properly the Murrain, though it begun with the Garget.

It is very essential to treat of these distinctly, for the Remedies are different; and the proper Distinction is this: the *Garget* is the swelling of the Head, Eyes and Lips, extending itself to the

Gums and Tongue, but no farther: when it goes farther it acquires another Name.

The most usual Cause of the Garget is *bad Water*; but the extreme Degree of it and of the Murrain often arise from an infectious State of the Air; and it would be vain to seek their Origin elsewhere.

When the Farmer sees an Ox or Cow affected in this Manner, with a Swelling in the Head discovering itself about the Eyes, the first Thing he is to do is to examine the Lips; and if they are swelled, he must look into the Mouth and examine the Tongue.

He must be careful in his Observations, because upon the Difference in this Respect depends the Method of Cure which is peculiar in each Degree of this terrible Distemper.

If the Eyes, Lips, and whole Outside of the Head be affected, and nothing more, the Remedy is to be as follows.

First let the Creature be blooded very largely; and immediately after give the following Mixture.

Heat a Quart of Ale, and dissolve in it three quarters of an Ounce of Mithridate; add ten Grains of Saffron, and a Tea Spoonful of sweet Spirit of Nitre: give this every six Hours, and observe whether the Swelling about the Eyes decrease; for this is the great Symptom by which to know whether the Medicine takes Effect. Give the Drink warm, and as much as the Creature pleases.

If the Swelling continues; especially if it increases, bleed again more largely than before; and instead of the Medicine before directed, give three Ounces of GLAUBER'S Salt dissolved in Water.

This will purge the Creature pretty briskly; and by this Change of the Remedies there is a fair Chance for a Cure: but we don't pretend to promise that Certainty of Success in these as in many of the preceding Cases.

The Distemper is of a very desperate Kind; and there is always Danger. If these Methods both fail, the only proper Course is to continue them interchangeably, till there is an Amendment or Death. But we have seen it in many Instances, that the first Doses have been successful.

The next Stage in which we are to consider this Disease, is that in which the Inside of the Lips and the Tongue are affected.

This is still the Disorder distinctively called the Garget, provided that the Outside of the Head be affected also; but if otherwise it is properly the Murrain, though in a less Degree than is usually understood by that Name.

This we have observed in various Instances: we have seen a Murrain, that at first appeared less terrible than a Garget; but it does not long continue in that Condition: it grows worse presently. The Appearance of the Murrain in the Mouth alone is only its first Stage, according to the peculiar Manner of taking the Infection.

The Farmer is to consider and examine this Distinction carefully; for those Medicines will be proper in one Case, that will be trilling in the other.

Thus then, if he first perceive the Outside of the

the Head swell, let him examine within the Mouth, to know whether it have also spread so far: and on the other Hand, if he first perceive the Disorder in the Mouth, let him next examine the Head on the Outside, to distinguish whether it be the Garget, or the first Stage of the Murrain. We are to suppose it the first of these Cases; and that he finds the Eyes starting, enflamed and swelled; the Lips hot and swelled; and perhaps the under Part of the Neck, for sometimes that joins: and he will also perceive the Tongue to be very much disordered. This in the present Case is a very essential Point; for the Tongue is usually the principal Seat of the Distemper.

Let the upper and under Side of the Tongue be searched carefully, and probably there will be found one or more Blisters on the Top or Sides; or a Lodgment of Matter under it; sometimes both.

These Blisters must be cut, and the Point of a Lancet or fine Knife must be thrust into the sore or swelled Part underneath.

This done, the whole Tongue is to be washed several Times with sharp Vinegar mixed with Salt, and rubbed with a clean Cloth: by this Means the foul and offensive Matter will be let out. Then the Creature must be kept to the following Course of Medicines.

First let him be largely blooded.

Then mix together a Pint of Ale, three quarters of an Ounce of Venice Treacle, a quarter of an Ounce of Anniseeds in Powder, and two Spoonfuls of the Juice of Rue: this is all to be heated and given at a Dose; and it must be repeated Morning, Noon and Night. Let the Creature be kept warm, and let his Drink be Water, that has been poured hot upon a good Quantity of the Herb Agrimony, and let him have it warm.

I have seen those who were impatient with this Course, give a Purge in a Day or two, but I never knew it succeed. Many have died while it was operating: and on the other Hand several have recovered by a careful Perseverance in this Course, which have at first seemed to afford very little Prospect of it.

~~See the next page for the full text of this chapter.~~

C H A P. XXII.

Of the Murrain.

THE Murrain is the highest Degree of these Distempers, and the worst that can fall upon the Cattle of this Species. What we call the Distemper among the horned Cattle at this Time, is the Murrain distinctly and properly so named. It is an Inflammation of the whole Passage through the Body from the Mouth to the farthest Extremity of the Guts; and it is attended with a very bad State of the Blood. It sometimes arises from very unfavourable Weather; the drinking bad Water, and being reduced to feed upon rank coarse Grass: but the general Origin of it is in the Air, which there is no accounting for. Some Cattle are, by the State of their Blood and Humours at that Time, more exposed to receive the pestilential Vapours

than others; but all are exposed to it: and when it has once taken Place, it spreads by absolute and plain Contagion.

This is the Cause of its being terribly destructive in some Counties, and scarce appearing at all in others: and to this it is owing, that wherever it gets Footing it spreads and continues.

There is no Wonder that Creatures standing near one another receive the Contagion with the Breath, which is sent out in the Respiration from the others; especially as the Temperature of the Air favours the spreading.

Upon this Principle we see the Wisdom of the Legislature, in forbidding Cattle from infected Places to be brought into Counties where the Disease is not: and this gives the Farmer the first Hint of his proper Conduct.

As soon as he perceives this terrible Disorder upon any one of his Cattle, let him separate that from the rest, and take Care of all.

The first Step is to bleed largely; and this should be extended to the sick and the well. In Respect to the sick, it is the proper Step to abate the Inflammation; and as to the rest it may be sufficient to prevent the breaking out of the Disease upon such as would otherwise have had it, from some slight Degree of Infection communicated before the Separation of the sick: or if it do break out upon them, they will have it more favourably.

In another Sense also it is very proper: we see that the Air is at these Times full of the pestilential Matter, and that some Cattle do and others do not receive it. Those whose Blood is in the greatest State of Inflammation are naturally most liable to it; and the Bleeding is a Way of taking off that Condition of the Mass.

The Cattle that are separated by Way of Preservation need no farther Care after bleeding; unless the Disease appear upon any of them. In that Case such as are taken with it must be separated from the rest; and this is the Manner of treating them.

As soon as they have been blooded, let a Quantity of Vinegar be made hot, and a little Salt dissolved in it; and with that let their Tongues, Mouths, Lips, and Teeth be thoroughly washed.

Beat in a Marble Mortar Half a Dozen large Heads of Garlick: press out the Juice, and add to it an equal Quantity of Tincture of Myrrh. Set on Half a Pint of Ale to be hot, and put to it a quarter of Pint of this Mixture. When it is all hot together pour in two Spoonfuls of Tar, and then immediately give it to the Creature.

The Tar will not mix with the rest, but it will go down with them.

Let this be repeated once in four Hours; and if there be no Amendment the first Day, let the Creature be blooded again the Day following, and the same Course continued.

I have seen many other Medicines tried, indeed almost innumerable; for of all Herbs and Drugs that the old Woman and the Doctor have ever recommended in pestilential Distempers, not one has been omitted on this Occasion. The Disease is in itself so terrible, that it would be Falshood and Folly to boast of vast Success from

from any: but this we can assure the Farmer, whose Condition we most sincerely pity when under this Visitation; that of all the Medicines that have come to our Knowledge this has succeeded best. Many have been absolutely recovered by it, when all who saw them shook their Heads, and supposed them lost.

Beside the great Value of this as a Remedy for the Disease when it is come on, there is nothing so good as a Preservative against it.

For this Reason, when some Cattle of the Farmers are taken ill, and are separated from the

rest; and when, one after another, several of those set apart fall into it, the whole Number of them should be preserved if possible from the same Fate, by taking largely of this Medicine.

The Farmer will not grudge his Trouble when he sees the Benefit that may arise, and when he considers the Danger from which he is defending them.

They should all have a Dose Night and Morning for ten Days after their Separation from the sick.



BOOK XIII.

SECT. III.

Of the Diseases of SHEEP.

CHAP.

1. *Of a Fever.*
2. *Of a Purging.*
3. *Of the Tag.*
4. *Of Disorders of the Lungs.*
5. *Of the Jaundice.*
6. *Of Stoppages in the Throat.*
7. *Of Sturdyness.*
8. *Of the Wood Evil.*

CHAP.

9. *Of the Staggers.*
10. *Of the Scab.*
11. *Of the Red-Water.*
12. *Of the Foot-Worm.*
13. *Of the Wild-Fire.*
14. *Of Disorders of the Eyes.*
15. *Of the Dropsy.*
16. *Of the Rot.*



The INTRODUCTION.

THESE tho' not so numerous as the Disorders to which the larger Cattle, before treated of, are liable, yet are such as it imports the Farmer as well to understand; for they are as fatal as those of the other Cattle, and some of them as difficult of Cure, though the greater Part are easy. We shall explain them severally, according to their Nature; and having established their Distinction according to the Cause and Symptoms, shall lay down for the Cure such Methods as have been found successful, upon repeated Experience, within our own Knowledge.



CHAP. I.

Of the Fever.

THE Farmers know very well what they mean by the Fever in their Cattle, and the Name is not without just Reason. The Fever in Sheep is an inflamed State of the Blood, disordering the Eyes and Mouth, so that it is easily seen, and affecting the whole Body of the Creature, though not so visibly.

When these Signs of a feverish Disposition appear in Sheep, the Farmer must feel their Feet; if they are hot, he may be sure he has guess'd right as to the Nature of the Distemper; and this is a needful Caution, because there are other Disorders that will give an inflamed Look to the Eyes and Mouth.

The Disease is often destructive in itself; and frequently it brings on other fatal Disorders.

The Cause is generally Cold. When only

two or three are affected by it, the Case is less desperate; but when many together, it is always the more fatal.

The first Thing to be done is to remove the Cause; that is, to keep the Sheep in a warmer and more sheltered Place.

In the Heat of Summer the weaker among the Flock will be sometimes rendered feverish, only by being exposed too much to it; and in this Case the first Method is just contrary to the former: he must drive them to shelter: in either Condition they must be kept quiet, and must have wholesome sweet Grass and fresh Water. Then the following Remedies will take place:

First bleed the Sheep that are affected with the Disorder, and afterwards give to each the following Medicine with a Horn.

Heat a Quart of Ale, and dissolve in it an Ounce of Mithridate, add half an Ounce of Virginian Snake-Root, and one Dram of Cochineal in Powder. This Quantity serves for four Doses, and one of them is to be given Night and Morning.

If the Sheep be bound in its Body, an Ounce of Lenitive Electuary is to be mixed with each Dose; but if looser than ordinary, that is not to be regarded during the Course of the Remedies, for it will contribute to the Cure. The four Doses usually are sufficient.

C H A P. II.

For a Purging.

WE have directed the Farmer to leave Nature to her Course when a Purging comes on, with a Fever, in Sheep; but when the Fever is abated, the Purging must be stopp'd; and the same Remedy that answers for this Purpose, may be given in the same Manner for such Purgings as come on of themselves.

Boil a quarter of a Pound of Raspings of Logwood in two Quarts of Water, till but a Quart is left; when it is near done, put in a Stick of Cinnamon. When it is done, strain it off, and give the Sheep a quarter of a Pint of it, with a Horn, four Times a Day, till the Purging ceases.

This seldom fails to take Effect very kindly upon that Kind of Purging which was a Symptom of a Fever, though it remains after it is over; but if on other Occasions it does not stay the Disorder, the following Addition will render it sure of Success.

To every Dose of this add a quarter of an Ounce of Diascordium without Honey, and ten Grains of Japan Earth powdered; give the Doses only Morning and Night when they are thus increas'd in Strength.

C H A P. III.

Of the Tag.

THIS though an external Disorder, yet naturally comes in here, because owing to the Complaint last named.

It is a Disorder of the Tail beginning with Filth and Foulness, and ending in Ulceration and very bad Consequences.

The Tag is situated in the inner Part of the Tail: it consists of Scabs and Sores, very painful and wasting to the Creature; and it is owing to the fouling of this Part by a Purging.

That Tag is always worst which follows a Fever, because the inflamed State of the Blood tends to encrease the Disorder; and when it begins, during the Continuance of the Disease, the Matter of the Fever may chance to settle there. In either Case two Things are to be done; the first is, to stop the Purging, that the Stools may fall as usual; and the other, to clean the Tail.

The last mentioned Remedy, either in its weaker or stronger Form, is to be used to stop the Purging; and the Tail being clipp'd, and the sore Part laid bare, first wash it carefully with Milk and Water Blood-warm, and then with Lime-water. After this turn the Sheep loose into a clean dry Pasture.

Two Days after look at it again, and, if not well, repeat the Washing, and anoint it with Grease and Tar mixed together. Twice doing of this is generally sufficient for the compleating of a Cure.

C H A P. IV.

Of the Disorders of the Lungs.

SHEEP are very subject to be disordered in the Lungs, which is easily perceived in their Breathing or by their Coughing: nothing requires a more speedy Remedy; for they grow incurable when it is neglected but a little Time; and die as Men in a Consumption.

Change of Air and Pasture are essential to the Cure of this Disease; without this Caution no Remedies will take Place: with it the following rarely fails.

The Cause of this Disorder, in whatever Form it appears, whether in coughing, wheezing, or panting, in Difficulty or Shortness of Breath, is the same. It is owing to Cold; and it generally comes upon Sheep that have been kept in low Grounds in wet Weather.

First drive them into an enclosed Pasture where there is short Grass and a gravelly Soil; and, if possible, where there is spring or other running Water.

Bruise a Basket-full of the Leaves of Colt's-foot, and press out the Juice.

Bruise in the same Manner an equal Quantity of Plantain, Leaves and Roots together, and press out its Juice. Mix these, and bruise as much Garlick as will yield about a fourth Part as much Juice as one of the others, Mix all together, and add to them a Pound of Honey, an Ounce of powdered Aniseeds, and an Ounce and half of powdered Elecampane; give a quarter of a Pint of this, warm, to every Sheep that is affected, once in a Day, and it will by Degrees make a perfect Cure.

Out of a whole Flock thus affected, when the Farmer has taken thorough Care in this Respect, I have known when not one Sheep has been lost. I write this from Experience.

C H A P. V.

Of the Jaundice.

SHEEP are more subject than any Animal whatsoever to Obstructions of the Liver; and this is generally seen in a Yellowness of the Eyes, and a Tinct of the same Kind in the Skin, when carefully examined. Our Farmers, in some Places, call this the Choler; or, as they speak it, the Colour: it is properly a Jaundice.

Drive the Sheep that are affected with this Disorder into an open Pasture; and let the Shepherd or Person who has the Care of them, have Orders to keep them often in Motion, but not to fatigue them; then prepare the following Remedy.

Boil in four Gallons of Water two Pound of Fennel Roots, the same Quantity of Parsley Roots, and twice that Quantity of Roots of Dog-Grass, or Couch-Grass, all cut small; when the Water is very strong of them, and there is about half the Quantity left, strain it off, pressing it hard.

Bruise

Bruise in a Mortar as much Great Celandine as will yield three Pints of Juice, add this to the Liquor, and lastly put in three Drams of Salt of Steel.

Mix all well together, and every Day heat so much of it as will serve to give every one of the Sheep that is ill a Gill and half for a Dose. This, with the forementioned Directions of good Pasture and Water, and moderate Exercise, rarely fails of a Cure.

C H A P. VI.

Of Stoppages in the Throat.

WE have treated of Disorders of the Lungs, and shewn the Remedy; but the Farmer will yet find another Disorder imitating the Appearance and Symptoms of these, which is only in the Throat. The Sheep affected with this, wheeze and breathe with Difficulty. It commonly arises from bad Pasturage and Colds. The Remedy is this: Drive them into a higher Ground and keep them warm; then give the following Medicine.

Bruise a good Quantity of Penny-royal, and squeeze out the Juice. Put to a Quart of this a Pound of Honey, and half a Pint of sharp Vinegar.

Give the Sheep half a Pint of this, Blood-warm, every Night.

Penny-royal is, by some, delivered as a general Remedy for all Disorders of Sheep; but this is very erroneous: nothing has been hitherto so little understood as the Medicines proper for Cattle. What are here delivered, are, in general, supported by Experience; and that Physician who has Judgment to propose more Remedies, and Patience to see them try'd fairly; to approve and establish the best, alter and amend the others, and finally to publish the Result of all, will deserve a Statue, for the Good done to his Country, more than all her Heroes.

C H A P. VII.

Of Sturdyness.

THE Disorder Farmers call by this Name, is a Kind of Vertigo or Giddiness in the Head in Sheep. It rises principally from very rich Feeding, and is often fatal. The Cure is this.

Bleed the Sheep largely, then give the following Draught. Bruise some Roots of wild Valerian, squeeze out the Juice, heat it, and give a quarter of a Pint. Repeat this once in four Hours.

When the Sheep is recovered, turn it upon the Common, or into some barren hilly Pasture; it will be kept from Relapses by having but little Food, and that perfectly wholesome. When this Disease returns it is commonly fatal.

C H A P. VIII.

Of the Wood Evil.

THE Disorder Farmers understand by this Name is a kind of Cramp: it seizes the Legs of Sheep, and will often affect a whole Flock at once.

The Cause is cold and wet. The lying under the Drip of Trees in Rainy Seasons has often occasioned it, and thence it got the Name of the Wood Evil.

The first Care is to remove the Sheep into a dry Pasture, and then the Cause being removed, proper Remedies may take Effect upon the Disease, which would otherwise be incurable.

Boil in a large Quantity of Ale as much common Cinquefoil and Hedge Mustard as can well be stir'd into it. When the Liquor is very strong, strain it off, and add a Pint of Juice of Valerian Root to every Gallon of the Decoction.

Give the Sheep that are affected with the Illness half a Pint of this, in a Horn, Morning and Night.

Boil in Vinegar a large Quantity of the Leaves of Hedge-Mustard, and with this Liquor, hot, rub the Legs of the Sheep.

The Trouble of this Method must not dishearten the Farmer from observing it punctually, for the whole Flock may be lost if it be neglected; and when they are once relieved, and in a warmer Pasture, they seldom relapse.

C H A P. IX.

Of the Staggers.

SHEEP have this Disorder as well as Horses, and it arises from improper Food. They are apt to crop the young Shoots of Trees when in their Reach; and though many of these are wholesome, some are hurtful. It is found by Experience, that the eating the Oak Leaves and Buds is particularly prejudicial; it binds them in the Bowels, and frequently the Staggers follow.

The Symptoms are much like those of the Sturdyness, described before, but more violent; and there is generally a Trembling, at the same Time, of all the Limbs. The Remedy is this.

Dissolve an Ounce of Asiafoetida in two Quarts of Water. Give the Sheep a quarter of a Pint of this, warm, every three Hours; it commonly opens their Bowels at the same Time that it takes immediate Effect upon the nervous Disorder, and thus performs a perfect Cure. Some of our Farmers put the Asiafoetida into the Ears of the Sheep; but that is a very idle Practice. The Medicines are easily given them inwardly with a Horn, and there is no other Way in which any Dependance can be placed upon them.

When the Sheep are thus recovered, let them be kept out of the Way of a Return to the same Food, and they will be in no Danger of a Relapse.

The Farmer will see by the several Accounts of these most ordinary Diseases incident to Sheep, that

that they are not so subject to them as many other Creatures, from a Variety of unknown Causes, but fall into them principally from a bad Method of keeping. In general, low Grounds are the most unwholsome; for they abound with wet, and they give Birth to many Weeds of a poisonous Nature not found in others. And we see that Woods are disadvantageous on many Accounts: therefore let him be careful of his Feeding, and he will have less to fear on Account of Disorders in this Kind; and when they so happen, they will be lighter and more easily remedy'd.



C H A P. X.

Of the Scab.

THIS is a filthy Disorder to which Sheep are very liable; but as many of the others, before described, arise oftener from ill Management than any natural Defect, so this more than any.

Sheep kept on Downs, or in dry wholsome Pastures, are very little liable to it; those which lie wet, or get under Droppings of Trees in bad Seasons, are frequently affected by it in the severest Manner.

When the Wet falls upon their Skins, and they are heated afterwards; but especially when they lie under Trees and the Wet falls upon them from the Branches, their Skins soon after grow scurfy, and in a little Time from that there rise Scabs in various Parts of them; upon this the Wool grows loose, and the Sheep pine and become lean.

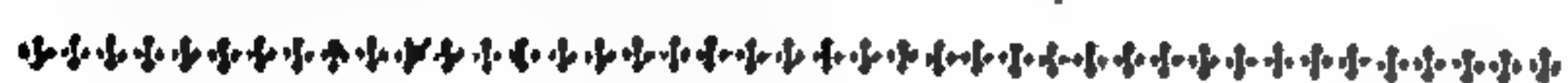
If it be a Season for Shearing, or that can be done with any Degree of Propriety, nothing is so good a Step to the Cure: if not, the same Remedies must be applied without: Cleanliness is the great Article for keeping them well; and it is vain to begin a Cure without it.

They must be washed every where in the foul Places with Soap-suds, made very strong, and used warm with a Flannel or Brush.

After this they must be turned loose in a clean Pasture, and must be driven up again as soon as well dry'd, and all the sore Parts must be well wetted with Lime-Water.

In both these Applications, the scurfy Parts of the Skin, as well as the scabby Places, must be regarded; and probably the doing this three Times, at two Days distance each, will be a Remedy.

If this fail, the Parts that have been thus washed and cleaned, must be anointed with a Mixture of equal Parts of Tar and Grease, and they will soon be perfectly well. No inward Medicines are required in this Case, for the Complaint is only on the Skin.



C H A P. XI.

Of the Red-Water.

FARMERS do not seem well to understand themselves in respect of this Disorder, but in some Places call an inward Disease, and in

others an outward one, by this Name. The last is the proper Meaning of the Word, and it is a very dangerous Disorder. Though it appears outwardly it is not entirely of the external Kind, as the former; but the Blood is always more or less affected with it, and consequently Care must be taken accordingly, by inward as well as outward Medicines, in the Cure.

The great Mistake has been the attempting it by outward Remedies alone, and this is the Cause why it has been found so difficult of Cure.

The Appearance of the Disorder is about the Breast and Belly principally, but it will spread itself to other Parts. It is an Inflammation of the Skin that often raises it into Blisters, and in those is contained a sharp Humour, thin, watery, and coloured with Blood. This is the Occasion of the Name, and this the Disorder properly called by it.

Nothing must be done to strike it in, but the Cure regularly attempted by amending the bad State of the Blood.

First, the Sheep that are affected with it, must be separated, or otherwise it will be very apt to spread among them; and they must be put where there is sweet Grass and good Water, or the Medicines will take little Effect.

Mix half an Ounce of Flour of Brimstone with an Ounce of Honey; work it well together, and then divide it into two Parts. Dissolve one of these in half a Pint of Juice of Nettles, and give it every Day for a Fortnight. This Method observe with all that are disordered.

Slit the Blisters when they are full of this watery Humour, and having let the Matter out, wet the Place with Juice of Wormwood.

After four Days of this Course, bleed them pretty plentifully; and then continue the same Method till they are well.



C H A P. XII.

Of the Foot-worm.

SHEEP are liable to the breeding of Worms between their Feet; but this, like the other Accidents, is principally when they are kept in wet or damp Pastures. It is very painful to them, and will make them pine away.

It is perceived by their frequently holding up one Foot; and by their setting it but tenderly down.

In this Case let the Foot be washed clean, particularly between the Toes, and there will be seen a little Lump like a Tuft of Hair. This is the Head of the Worm. It is to be taken out with Care, for 'tis of a tender Substance, and if it be broke in the Foot it will occasion an Inflammation. The best Method is to open the Flesh on each Side of it, and then, by Means of a Pair of Knippers, to take it very gently out.

Then dress the Wound with Tar and Grease melted together in equal Quantities, and turn the Sheep loose.

It is better to put it into a fresh Pasture; for if the same Disorder returns, it is generally worse.

CHAP. XIII.

Of the Wild-Fire.

THIS is a very violent Inflammation, which appears in the Manner of a Saint Anthony's Fire, upon the Skin of the Sheep, in different Places; and when it is discovered on one generally infects more; often the whole Flock.

Our Fore-fathers were superstitious on this Occasion, they bury'd the Sheep alive with its Feet upwards at the Door of the Fold; and supposed this acted as a Spell to drive away the Disease. We do not inherit these Errors. The Method to be observed is this.

Such Sheep as are infected with it, are to be separated from the rest: then bleed them, and prepare the following external Remedy. No other is required: and it is singular in this Disorder, that although more violent than the Red-water, it does not at all infect the Blood, so that nothing inward need be given.

Bruise a good Quantity of the Leaves of wild Chervill, and add to them as much Lime-water as will make the Whole very soft. When it is thus beat up together and perfectly mix'd, add as much Powder of Fenugreek-seed as will reduce it to the Consistence of Pap; then put it into a Pan, and set it in a cool Place. Rub the fore or inflamed Part carefully with this every Evening, and make as much lie on as can be kept there; it will take Effect during the Time of Rest, and is to be repeated as long as there is Occasion.

CHAP. XIV.

Of Disorders of the Eyes.

SHEEP are often affected with Colds falling upon their Eyes, and almost blinding them; and, at other Times, the same Accidents arise without any visible Cause. The Remedy in either Case is the same.

Press out the Juice of Great Celandine, and drop a Quantity of it into the Eyes Night and Morning.

CHAP. XV.

Of the Dropsy.

SHEEP are often swelled with Water in their Bellies; and this, if not regarded in Time, is attended with certain Destruction. There are two Ways in which it is lodged; the one is between the outward Flesh and the Rim; the other is within the Rim. In the first Case, the Cure is easy; in the other, nothing can be done.

The Method, in the first Case, is by a coarse kind of Tapping.

An Opening is to be made in the Flesh, and a Quill thrust in; this will give the Water a free Passage out, and the Wound heals of itself, if Numb. LIX.

if the Sheep be otherwise tolerably healthy: but when the Disease has been of long Continuance, and the Creature is emaciated by it, Nature will not have Strength to heal it: in that Case, the Sheep is to be examined daily, and the Wound dressed with Grease and Tar.

The Creature must be put into a fresh, dry, and wholesome Pasture, and then disposed of as soon as recruited; for this is a Disorder that never fails to return upon any Mismanagement or Neglect in the Keeping.

CHAP. XVI.

Of the Rot.

THE Rot among Sheep is like the Murrain among larger Cattle, the most destructive of all the Disorders to which they are liable, and the most to be dreaded by the Farmer. We have reserved it for the last Consideration, that what has been premised concerning the other Disorders, may have led him so far into the Nature of Animals, as to make him perfectly comprehend all that relates to this.

This Disorder is contagious, like the Murrain. Whenever it appears it usually spreads thro' the whole Flock; and often over the whole neighbouring Country.

Preservation from it is a Point of as much Importance as its Cure; indeed of more, because the Cure is very uncertain.

The Causes of the Rot are various, but the principal is Carelessness in the Owner. Sheep that feed at large upon open Commons, are much more subject to it than such as have Shelter, and are taken due Care of at Nights: those which feed in the dampest Grounds, are most subject to this, as to other Diseases; and it frequently arises from a cold Season and dribbling Rains coming on soon after the Shearing. These taint the Skin, and bring on the Disorder. Lastly, want of Food will occasion the same Disease; and the eating such Grass as is full of unwholesome Plants. These we shall particularize in a succeeding Chapter.

Such are the Causes of this terrible Disorder in its original Appearance in many Places; but the Farmer, beside these, is to observe that the worst and most common is Infection.

Let him, at all Times, take Care to keep his Sheep out of the Way of these original Causes of the Rot; and he will find the same Care will preserve them from most other Disorders: and, beside this, when the Distemper is any where near him, let him be careful to keep them clear and distant from all others.

Damp Grounds are always dangerous in this Respect; and in wet Seasons especially.

In these wet Times, the best Practice is quickly to remove the Flock to the upland Pastures, and to give them some Hay as a Part of their Food.

The happiest Thing that can chance to the Farmer in this Case, is to discover the Disease in Time. The first Notice of it will be perceived in the Eyes; and therefore in a wet Season, and especially at a Time when the Rot is
amongst

among the neighbouring Sheep, let him look into that Part. When a Sheep is infected with this Disorder, the White of the Eyes looks dead and dull, and they have a weak faint Aspect; the Creature is feeble, and his Skin is foul: the Wool is so loose that it comes off in Handfuls with the least Touch; and the Gums will look pale and the Teeth foul. He will be dull and listless in Motion; and heavy, as if his Legs were not able to carry him.

In this Case, the Disease is strong upon the Creature. Many are generally infected at a Time, and the first Care must be to remove them from among the sound ones: the distinction may be made by the Rules we have just laid down; and the sick must be pent up in a close Fold.

They must be allowed little Water; and their Food must be dry Hay and Oats. The best Way of giving these, is by Means of Troughs placed all round the Fold.

Bleeding, which is beneficial in most other Disorders, is altogether destructive in the Rot. Some have try'd it; and what I write is in Consequence of what I have seen as the Result of their Practice.

It has been observ'd universally, that Sheep fed in Salt Marshes never have the Rot. This put it naturally into People's Thoughts to try Salt as a Cure; and we read Wonders of its Effects.

This also I have seen try'd, and sometimes with good Consequences; but never with the great Success that is boasted by many. Salt is a Preservative against the Rot; and that is all we rationally learn from the Cattle not being infected with it, that feed in the Salt Marshes; but it is not so certain a Cure.

The best kind of Salt for this Purpose, is Bay-salt; and the best Way of giving it, is by beating it to Powder, and then sprinkling it among the dry Food. Though we do not advise the Farmer to rely upon it entirely, we shall re-

commend it, among other Remedies, in this Manner.

Bruise to Powder an Ounce of Grains of Paradise, and four Ounces of Juniper-berries dry'd; add to these two Pounds of Bay-salt and half a Pound of Loaf Sugar, grind them all well together, and sprinkle some of this upon the Hay and the Oats that are given the Sheep.

Let this Course be continued three Days, and look from Time to Time into the Eyes of the Sheep; and examine every other Way, to see whether they mend or grow worse. If there be Signs of Amendment, let the same Course be continued: if not, the following must be used. Steep four Pounds of Antimony in two Gallons of Ale, for a Week; then give the Sheep this every Night and Morning, a Quarter of a Pint at a Time.

Boil a Pound of the Roots of the common Avena, and two Pounds of the Root of Masterwort, in two Gallons of Water, till there is not more than six Quarts remaining: strain this off, and press it hard; then pour a Pint of it into a Pail-full of Water that is to be given to the Sheep.

By these Means, carefully managed, and under a good Regulation in the Articles of Cleanliness, Dryness, and Warmth, the Rot will be often cured: this is all that can be promised upon the most sanguine Expectations; for there are Times when the Disease is so rooted, and when the Temperature of the Air so favours it, that nothing will get the better of its Violence.

In the Course of this Method, if the Sheep have a Distaste to their Food, because of the Salt and other Ingredients mixed among it, they must be omitted for two or three Feedings; and then given in less Quantities: and if this take Effect the other need not be used; if otherwise, it will be best to take the Benefit of both together; the Salt and other Ingredients being sprinkled among the Food, while the Drenches are given at the regular Times.

B O O K XIII.

S E C T. IV.

Of the Disorders of H O G S.

CHAP.

1. *Of the Fever.*
2. *Of the Murrain.*
3. *Of the Jaundice.*
4. *Of Sickness at the Stomach.*
5. *Of the Measles.*
6. *Of the Letbargy.*

CHAP.

7. *Of the swelling of the Milt.*
8. *Of a Purging.*
9. *Of Imposthumations and Boils.*
10. *Of Foulness of the Skin.*
11. *Of sore Ears.*
12. *Of the Pox.*

The INTRODUCTION.

THE Hog is not without its Disorders, tho' they are not so many as those which attend the Sheep. We shall not leave the Farmer uninstructed in any thing that concerns his Interest; wherefore we name them here, and shall deliver the Symptoms by which they are known, and the approved Remedies.

C H A P. I.

Of the Fever.

WE have shewn how common a Disease a Fever is among Cattle of most Kinds; and the Hog is not exempt from it. The first Symptom

of it is his forsaking his Food. The Hog has a ravenous Appetite from Nature, and when the Farmer perceives this he may be sure something is much amiss. He will soon after be perceived to droop and grow faint, and if not taken some Care of will pine in his Flesh, and the Disorder will end in his Destruction.

The first Step towards a Cure is bleeding, and the best Place for performing this Operation is behind the Ears. If this Part do not bleed freely, his Tail is next to be cut; and between one and the other there will be got enough. A Pint is a proper Quantity to take away.

After the bleeding put him up warm, and give him a good hot Mefs made of Rasplings of Bread, Broth, and some chopped Penny-royal.

This is a Thing he is very fond of: the Bleeding will have given him some Relief; and he will take to it. As soon as he has well tasted it take it away.

This will make him ravenous, and he will swallow it with the Addition of a Medicine, which he would not have done before. This must be Philonium Romanum. Half an Ounce of it must be put into a Gallon of the Mefs, and he must eat a little at a Time. If he take above half he will have an over Dose of the Medicine, therefore it must be taken away; and eight Hours he must be kept without any thing else. This will make him ready to take the Remainder; and that probably will make a perfect Cure.

It will be seen when he is well by his eating freely and heartily: and if he do not appear much recovered the next Day the Bleeding must be repeated, and the same Medicine given again.

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## C H A P. II.

### *Of the Murrain.*

**T**HIS is as fatal to Hogs, as to other Creatures of the Farmer's Stock.

It is owing to eating a vast deal of bad Food; and it discovers itself by the Wateriness of the Eyes, and by the hanging of the Head to one Side: the Creature also is weak, faint, and refuses its Victuals.

The Cure is this. Make a very good warm Mash; and let them be kept all the Afternoon and all the Night fasting before it is set before them. Put into it half a Pound of grey Ground Liver-wort, and the Bigness of an Egg of Red Oaker, with as much Salt-petre as will lie upon a Shilling, powdered.

The Hog will generally be tempted to eat some of this after so much fasting.

When he leaves off, if he have swallowed ever so little, take it away.

Four or five Hours after set it before him again, and he will eat more; and by this Means he will be brought to his Stomach. All his Food must have a little Salt-petre and a good Quantity of Liver-wort in it. This will take Effect, if he be within the Reach of Remedy: but it is a Disease that is very often fatal. Clean-

liness and good Management must assist, or no Medicines will do.

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C H A P. III.

Of the Jaundice.

THE Hog is subject to an overflowing of the Gall, which would discolour the Skin if it were less thick and coarse; but it shews itself by a Yellowness of the Eyes and about the Lips, and by a Swelling that rises under the Jaws. The Cure is this. Bruise a good Quantity of great Celandine, and press out the Juice; add to it one fourth Part the Quantity of Vinegar.

Bruise a good Quantity of Wood-Lice in a Mortar; and when all is ready make a hot Mash into as much of this as the Hog will eat at a Time; put a Pint of the Juice and Vinegar, and about a Quarter of a Pound of the bruised Wood-lice.

Let him fast three Hours before he has this, and six Hours after it.

He will like the Mash the better for these Ingredients.

If his Stomach be so bad that he will not eat it all at once, it must be taken from him as soon as he shews a Distaste to it, and set before him again in half an Hour after.

A Hog will thus be led to eat almost under any Sickness: and this is the true Method of curing his Disorders of whatever Kind.

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## C H A P. IV.

### *For Sickness at the Stomach.*

**T**HE Hog, though his Stomach is naturally very strong, is subject to Sickness, and will cast up his Food. If this be not observed it will encrease upon him, and he will waste away. The Cure is by a Change in his Food; or if it be necessary the Addition of a Medicine with it: but the first usually answers.

Keep him from all coarse Meats, and give him Beans with a little Water. If this answer alone, it is better than giving Medicines: if it do not, give him every Day among his Food half an Ounce of Mithridate. It will at the same Time warm and strengthen his Stomach; and he must be kept to good Food for Fear of a Relapse.

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C H A P. V.

Of the Measles.

THIS is a common Disorder among Hogs, and shews itself in a Redness of the Eyes, and Foulness of the Skin, and in their neglecting their Food.

The best Remedy is this. Keep the Hog fasting the whole Afternoon and Night. Then set before him a good Mefs of Victuals; not large in Quantity, but hot and well prepared, and put into it forty Grains of Salt of Hartshorn and two Ounces

Ounces of Bole Armoniack. It will all go down very well after this Fast; and will make a good Beginning of a Cure. The same Method is to be followed every Day till he is perfectly recovered, and for a few Days after, for Fear of Returns.

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#### C H A P. VI.

##### *Of the Lethargy.*

**T**HE Hog will sometimes fall into what is called the Sleeping-Evil or Lethargy. He will doze all Day long, neglect his Food, and pine away.

The Remedy is a Vomit; and the best in the World is this.

Gather a good Quantity of Wall Pepper, called also Sharp Stone Crop. Bruise this in a Marble Mortar, and press out the Juice.

Keep the Creature fasting all the Afternoon and Night, and in the Morning set before him a warm Mess, into which put a Pint of the Juice of the Stone Crop. He will be tempted to eat by his long Fast; and the Hog is not very curious about Tastes. He will vomit soon after he has swallowed it; and that single Dose will frequently prove a Cure. If this be not sufficient it must be repeated next Day.

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C H A P. VII.

Of the swelling of the Milt.

WHEN a Hog is perceived to be giddy, to reel, and to run principally on one Side, the Farmer is to understand that it is his Milt that is swelled, obstructed, or disordered; and if he be not relieved he will forsake his Food, and pine to Death.

The usual Cause of the Disorder is a Surfeit in feeding upon Mast.

The Cure is this. Bruise a good Quantity of the Leaves and Tops of common Wormwood, and press out the Juice: add to this some Juice of Penny-royal, and give the Hog a Pint of it in every Mess of his Victuals till he is perfectly recovered; which will be known by the Steadiness of his Walk and Quietness.

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#### C H A P. VIII.

##### *For a Purging.*

**H**OGS that are taken with a Flux often have it grow to a great Violence upon them, and waste with it till they are only Skin and Bone. It generally rises from bad Food. The Cure is this. Make a good Mess of Food for him, and put into it half a Pound of Acorn Husks. Observe whether he grow better. If he do, repeat the same Method till he is perfectly cured.

If this do not succeed, give him in every Mess of his Food a Handful of Tormentill

Roots chopped small. This scarce ever fails of completing the Cure.

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C H A P. IX.

Of Imposthumes or Boils.

HOGS are subject to Boils and hard Swellings in various Parts; and the best Method is to open them, and let out the Matter at a proper Time. A common Knife answers this Purpose. The Farmer must observe to watch for their growing soft, that being the Mark that they are in a Condition to be cut. He is then to lay the Boil open the whole Length, and press it on the Sides to get out the Matter; and when this is done he must anoint the Place with Grease and Tar, and it will heal presently.

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#### C H A P. X.

##### *Of Foulness of the Skin.*

**T**HE Hog is naturally an uncleanly Creature, and the Farmer must therefore take the more Care to be cleanly in his Management. A wet Styre will subject him to Colds; and Fevers will rise from this: but if it be wet and nasty together, which is too common a Case, the first Consequence will be a Foulness, Scurf, and Scabiness of the Skin. The Hog will pine, and all his Meat will be thrown away upon him, unless this be cured.

The Blood is often in Fault in these Foulnesses of the Skin, and then inward Remedies are needful: the others may be tried first, and if they do not take Effect, that is a Proof these are wanted.

First bleed the Hog under the Tail, as much as can be well got away: it ought to be a Pint at least. Then prepare some very strong Soap Suds. Rub common soft Soap upon a Scrubbing Brush, dip it in the Suds, and scrub the Hog well all over. This will clean him.

After this wash him well with warm Lime Water, and make the Styre clean; give him dry Litter and wholesome Food, and after two Days clean him again in the same Manner, and again rub him with Lime Water.

If this do not make a Cure his Blood is infected; and Flower of Brimstone must be put into all his Victuals in large Quantities. This, with the Repetition of the other will cure. If the Skin be broken in any Place it must be dressed with Tar and Grease mixed together; and when he takes the Brimstone inwardly, some should also be mixed in Ointment.

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C H A P. XI.

For sore Ears.

Sometimes the Hog will have a Soreness about the Ears from Dirt and Filth: more frequently it rises from the Teeth of Dogs; and the worst is when both these Causes come together. The Dogs make the Hurts; and the

Dirt

Dirt occasions them to fester. The best Remedy is this.

Warm some Vinegar, and wash the Ears thoroughly with this till they are clean ; then make an Ointment of Tar and Grease in equal Quantities, and add a little common Soap. Rub the fore Parts with this, and repeat it till the Cure is perfected.

CHAP. XII.

Of the Pox.

THIS is a Name by which the Farmers express a Disorder of their Swine, that shews itself outwardly in a Multitude of Pimples and Blotches ; and keeps the Creatures miserable, and makes them pine and waste.

It rises from Wet and Filth in their Styes, and from unwholesome Food.

The Remedy is this. Make a hot Mefs for the Creature, and give in it an Ounce of Venice Treacle.

After it has taken this let the whole Skin be well cleaned with Soap Suds, and then wherever the Sores and Pimples are, use the following Ointment. Melt over the Fire two Pounds of Hog's Lard, and stir in half a Pint of Tar. When it is taken off the Fire, put to it as much Flower of Brimstone as will thicken it when cold into a firm Ointment. Rub this upon the Hog every Night for four Times, and keep him dry and clean, and it will commonly make a Cure in that Time.

The Farmer must observe that this Disease is infectious ; so that he must separate those Hogs which have it from the Rest, and not put them together again till they have been some Time well, and he sees there is no Return of the Disorder.



BOOK XIII.

SECT. V.

Of the Disorders of POULTRY.

- CHAP.
1. Of the Pip.

2. Of the Roup.

3. Of the Flux.

4. Of Stoppage of Stools.

- CHAP.
5. Of sore Eyes.

6. Of Vermin upon Poultry.

7. Of Sores.



INTRODUCTION.

THESE Animals have their Disorders like others ; and their Remedies are as efficacious and certain. The Farmer will the easier be a Master of this Part of his Care, because there is not the Difference between one Kind of Poultry and another, that there is between one Kind and another of the four-footed Animals. Their Distempers are the same in general of whatever Kind they be, and the same Remedies will make a Cure.



CHAP. I.

Of the Pip.

THIS is a Disorder peculiar to young Fowls, and it arises from the Want of Water. The natural Moisture of the Mouth in this Case hardens upon the End of the Tongue into a kind of Scale, and this prevents their feeding.

The greatest Care is required to observe in Time which of them have the Disease, for the Remedy is easy.

Let some Bay Salt be melted in a little Vinegar and set ready in a Saucer. Then let the young Creatures be taken up and the Scale loosened, and then pulled off from the Tongue with the Fingers. Then wet the End of the Tongue two or three Times over with the Vinegar and Salt,

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and turn the Chick loose where he cannot drink for an Hour.

This will prevent a Return.



CHAP. II.

Of the Roup.

THIS is a Disorder situated in a particular Part, but it will affect the whole Body. It is a small Swelling of an angry inflamed Kind upon the Rump. The Fowls that have it grow sickly, their Feathers stand rough, and they pine.

When they are seen in this Condition, let the Farmer seek for the Swelling and open it with a Knife. Let him squeeze out the Matter, and then wash the Part with hot Vinegar and turn the Fowl loose. This perfectly cures.



CHAP. III.

Of the Flux.

NO Kind of Poultry can thrive, unless they are properly in Order with Respect to their Excrements ; and wrong Food will throw them into Disorders in either Extream. This of the Flux is always occasioned by their eating too great a Quantity of moist Food. The best Remedy

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medy is to give them such Viſtuals for ſome Days as tends to the other Extreame: and if this fails them, to have Recourſe to more powerful Things.

Peaſe Bran ſcalded is a Food they will eat very freely; and it will commonly very well anſwer the Purpoſe.

If this does not ſet them right in two Days, rub to Powder ſome dry Roots of Tormentil and mix with it: this never fails; and they preſently grow well and hearty.

C H A P. IV.

Of Stoppage of the Stools.

THIS is the contrary Extreame, and is owing to a contrary Cauſe, namely the eating too much dry and binding Meat. It renders their Excrements too dry and hard, and prevents their voiding them ſo freely as they ſhould.

In this Caſe, as the former, the firſt Attempt to a Remedy ſhould be by the Food; and if that fail theſe Medicines muſt be added.

Thoſe Cures performed by a Change of Diet are always more natural and more laſting. For this give them Bread ſoaked in Broth; and if that fails, add to the Meſs a ſmall Quantity of Manna in this Manner. Skin off the fatteſt Part of ſome Liquor in which Meat has been boiled, diſſolve in half a Pint of this two Ounces of ordinary Manna, and then put in ſome Bread to ſoak.

They will eat this very freely, and it will certainly cure.

C H A P. V.

Of ſore Eyes.

THIS Complaint is very common among Poultry, and it is eaſily remedied. Their Eyes are often hurt by Accident in their going among Briars, and pecking one another; and they are alſo ſubject to ſwell and inflame with Colds. Theſe ſeveral Diſorders ſhew themſelves in various Parts of the Eyes and Eye-lids; but one Remedy ſerves for them all. This I have repeated often with Aſtoniſhment at its Succeſs.

Gather equal Quantities of Celandine, Ground Ivy, and Clown's Wound-Wort. Bruiſe them in a Marble Mortar, and preſs out the Juice. Add to half a Pint of this four Spoonfuls of White Wine, and dipping a Camel's Hair Pencil in it, rub the Eye-lids and Eyes carefully every Morning and Evening.

C H A P. VI.

Of Vermin upon Poultry.

Nature intended great Cleanlineſs for Birds; and in their wild State they never fail to obſerve her Dictates. When they are kept in a Yard they have not always Opportunity, and whenever it is omitted they ſuffer. Their Feathers keep their Skin ſo warm, that it is a natural Place for the breeding of Vermin of many Kinds: and what is more ſingular, every Kind of Fowl, as well as every Species of Beaſt, the Eagle and the Lion not excepted, have their peculiar Kind of Louſe, which will be ſure to appear when Uncleanlineſs encourages it.

The Means of Cleanneſs according to Nature are Plenty of good Water and ſome dry Ground; the Fowls will waſh themſelves in the one; and rub and dry themſelves in the other, whenever they have Opportunity; and thus keeping themſelves clean they are free from Vermin: but when they have foul Water it ſticks to their Skins, and gives Filth inſtead of cleaning it away.

Therefore to prevent the Evil, let the Farmer always take Care there be good Water; and a dry Soil in ſome Part of the Yard.

When it is come on the Remedy is this. Boil a quarter of a Pound of white Hellebore Root ſliced in two Quarts of Water to a Pint and a half. Strain this off, put it into a Quart Bottle, and put to it an Ounce of beaten Pepper, and half an Ounce of Scotch Snuff. Waſh the Skin wherever the Vermin are found with this, and it will prove a certain and a ſpeedy Cure. But if they be not thoroughly killed they will ſoon breed again.

C H A P. VII.

For Sores.

SORES and Swellings will often appear upon Fowls in different Parts of the Body, and they never fail to make the Creatures pine.

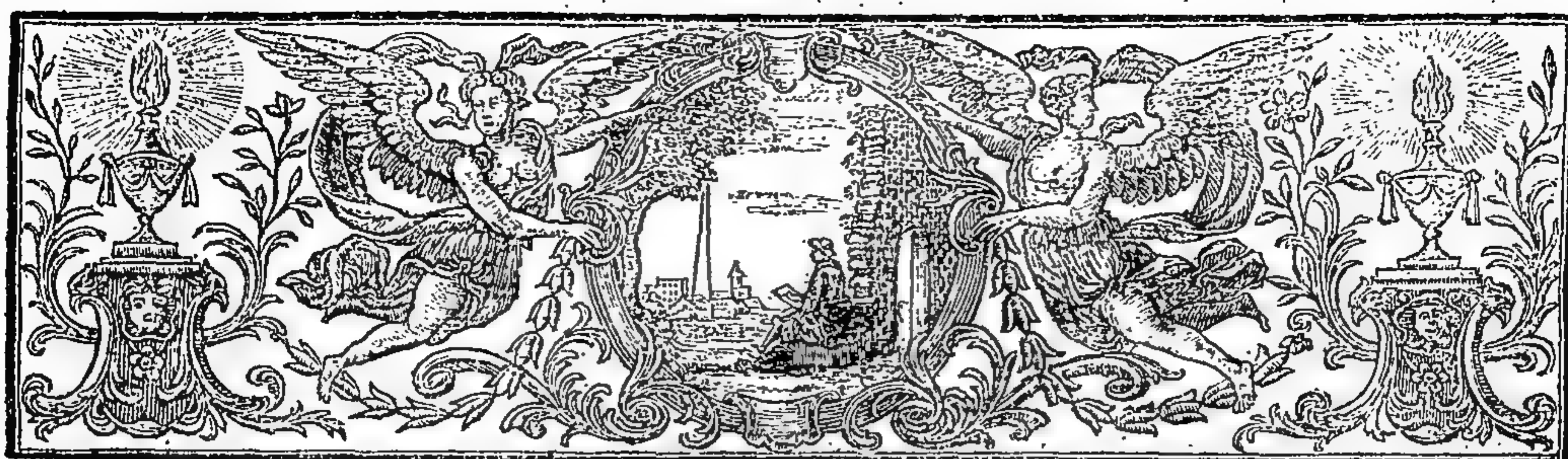
When Poultry droop, and their Feathers hang rough, let the Owner take them up and examine them carefully, he will uſually find ſome ſuch Diſorder.

The Cauſe is uſually bad Food, or bad Water, and ill keeping.

The Remedy is this. Melt together in a Pipkin equal Quantities of Reſin, Butter and Tar. When the Sore is found bathe it firſt with warm Milk and Water, and then dreſs it with this Ointment. Two or three Dreſſings uſually make a Cure; but they muſt be kept more carefully to prevent a Return.

End of the THIRTEENTH BOOK.

A C O M-



A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK XIV.

Of the Distemperatures of Trees, Roots, and Herbage, from the Injuries done by Insects, larger Animals, and Weeds.

IN THREE SECTIONS.

SECT. I. OF INSECTS.

CHAP.

1. Of Ants.
2. Of Beetles.
3. Of Worms.
4. Of Slugs.
5. Of Grasshoppers.

CHAP.

6. Of the Locust.
7. Of Caterpillars.
8. Of the Grub.
9. Of Flies.

INTRODUCTION.

WE have laid before the Farmer at large the several Accidents to which his Crops and his Cattle are liable, from the Seasons and other natural Causes; and it remains that we treat of those Distemperatures which may be termed accidental, because they are owing to the Hurts of Insects.

These, though very small Creatures, yet by their Number are able to do great Damage. This will be best guarded against by those who most thoroughly understand the Nature of those Creatures. We shall therefore treat of these severally according to their Kinds, and explain to the Farmer their Natures and Qualities; the Accidents, so far as they can be discovered, which cause their abounding at certain Times; and the Methods by which Vegetables of all Kinds, under the three distinct Heads of Trees, Roots, and Herbage, may be preserved from them:

founding all in this Part, as the preceding, on Experience.

CHAP. I.

Of the Ant.

THIS little Creature is a very troublesome Enemy to the Farmer in many different Articles, and must be destroyed in some Cases, and guarded against in others with the utmost Caution.

In Pasture Ground it raises Hills, which we have already shewn the Methods of cutting up and destroying: and in plowed Lands it will eat vast Quantities of the Seed before it sprouts. Birds devour much of it, but they wait to see the Shoot; otherwise they know not where to seek for it: but these little Enemies, whose Number enables

enables them to do vast Mischief, partly by what they destroy, and partly by what they carry away, follow it into the Ground, and are themselves unseen, as well as the Havock they make, till the Farmer finds the Misfortune in his poor Shoot. We shall direct him to perceive it sooner, for then it is too late for Remedy.

The Ants are great Breeders, and they are distinguished according to their Sexes: the Males have Wings, the Females none. There are several Kinds of them, the largest living in Woods; but these do little Mischief. The small common Ant is the Kind so hurtful to the Farmer.

Their Eggs are small and round, and they are seldom seen or regarded; what is commonly called the Ant's Egg, is a thin Shell or Case, in which it lies while the Wings are forming. It is strange, People could suppose Ants laid Eggs larger than their whole Body: but this is the Explanation of the Error. All Insects that have Wings lie in a still State some Time; the Silk-Worm, the Caterpillar, the Bee, and all others. This called the Egg is the same State of the Ant; and as they are utterly unable to move, during that Condition, the rest take Care of them, carrying them to Places of Safety.

The Mischief they do to Trees is by eating off the young Buds; but this is only of a few particular Kinds. Some Fruits also they are fond of, as is seen in Gardens. In Grass-Grounds they do no Harm but by those Hills, which are troublesome enough. In new-sown Corn-Fields they are most destructive, creeping in at the Chinks and Crannies of the Ground, and spoiling more than they devour or carry away. They are like the Wolf in the Fold, that will tear twenty Sheep to Pieces when he eats but of one.

Those Kinds of Grain are most subject to this Injury, that have the thinnest Skin and the sweetest Flour. Therefore Wheat is most subject to their Depredations; and the smallest Wheat the most: partly as its Skin is thinnest, and partly as it is easiest of Carriage.

Barley they will attack, especially that which is best, waiting till it is somewhat softened in the Ground.

The other Kinds that suffer most, are Hemp, Flax, and Cole-seed.

Rye they are not very fond of; and all Kinds of Pulse are safe, for they do not like them; the Skins are too thick, and the Meal too bitter.

In Gardens they are mischievous in the same Manner, eating one half of the Seeds that are put into the Ground.

The Remedy is the destroying them; and this is to be done several Ways. First let the Farmer find their Nests, which are under Hedges, about the Stumps of old Trees, and on little Risings of Ground.

Let him carry wet Straw to these Places, cover all the Nests, and fire it. The Smoak will destroy them. And if once going over the Ground do not answer the Purpose, it must be repeated.

The Time for doing this is half an Hour after Sun-set, for they are then all together. In Gardens 'tis a good Method to pour boiling Water upon their Nests, taking the same Time for it.

This is the Way to destroy Ants; but there is also a Method of preventing their Breeding. They hate Lime-Soot and Ashes; these are all good Manures, and should be used where Ants are most likely to come. 'Tis also a good Method to dress the Land with these after they have been choaked with burning the Litter. This perfects the Destruction of them, and they are seldom found to infest such a Piece of Land afterwards.

C H A P. II.

Of Beetles.

THE several Kinds of Beetles are innumerable; we have them from the Stag-horned Kind, which is nearly as big as a Wren, to the small black Beetle of the Rose-bush, which is scarce big enough to be visible.

They are all bred the same Way, and many of them are great Devourers. The Farmer is aware of them in their winged State; but there is another Condition in which they do him greater Damage.

In the End of Summer they lay their Eggs just under the Surface of the Ground. These hatch into thick white Maggots with six Legs, and after a Time of Rest they come out with Wings, in the proper Form of a Beetle.

In the Maggot or Grub State, they eat the Roots of Grass and Corn; and sometimes they are very terrible in this Destruction. Eight Years since they almost caus'd a Famine in NORFOLK.

In the Beetle State they prey upon Corn in the same Manner as the Ants. They creep into the Cracks of the Ground, and devour the best Grains. Their Time of Mischief is when the Grain is swell'd, and before it shoots.

They are more universal Destroyers than the Ants, for they have stronger Jaws, and less Nicety in their Taste. There is no kind of Grain or Pulse secure against them.

The Method of destroying them is this.

Just before the Sowing, carry some wet Litter into the Field; lay it in Heaps, and about Evening set Fire to it. That Fuel is best which makes most and thickest Smoak. They lie concealed in Bushes and Hedges, but they fly at Evening with the Owls: this is therefore the Time to destroy them or drive them away. They are afraid of Smoak as much as the Ants, and they will be choaked in great Numbers by it; and what escape Destruction will get far off.

The same Manures that are useful against the Ant, are in like Manner serviceable against the Beetle: and it is a very good Method, where they are very plentiful, or a Field is particularly in Danger, to scatter Lime over it just after Sowing.

The steeping of Seed-Corn in Brines, and other Liquors, we have treated of in its Place: one great Use of that Practice is defending the Corn from these Devourers; therefore, wherever there is particular Danger either from Ants or Beetles, the Farmer should be sure to put those Ingredients into the Brine which are most disagreeable

agreeable to them or most destructive of them: Among all these Ingredients nothing defends Corn so well against the Beetle as Urine.



C H A P. III.

Of Worms.

THE Gardeners imagine that Worms do them no Harm; but those who have observed the Course of Nature in the Field, can tell them they mistake. There is a particular Time at which they feed upon the Grain; and they are so numerous, that the Destruction is very great.

The Worm is produced in the common Way of other Animals; but it is particular, that each Creature of this Species has both the Sexes. This promotes their large Increase: and as they have nothing of that Change to undergo, which we have shewn must happen to all Winged Insects, there is no Stop in their Growth, and they arrive soon at Perfection.

There are three principal Kinds of Worms, the great and small red Worms, and the Olive-colour'd.

Of these the small red Worms are the most destructive. They are too common in good Lands naturally; and Multitudes are also brought on with the Dung.

The Time when they destroy the Corn is just when it has swell'd, and is beginning to shoot for the Blade and the Root. They at this Time prey upon its tender Substance, and are the Occasion of sometimes Two-thirds of a Crop missing.

A good Method of destroying them, is to drive a Number of Nails half way in upon the lower Part of the Plough which goes into the Ground. These tear the Worms to Pieces in great Numbers; and they are also very useful in the breaking the Ground more fine.

This is therefore, on all Accounts, a very good Method.

Another Way is, to make Fires of wet Litter on different Parts of the Land. This destroys many of the small Worms that are nearest the Surface, and they are what do the Mischief.

But the greatest Remedy of all is to steep the Seed-Corn in a proper Brine.

The Taste of Copperas is hateful to Worms; and they are no Way better guarded against than this.

It is supposed Hemp is destructive of them, or hateful to them, but Experience shews this to be an Error. I have seen Corn, steep'd in a Decoction of Hemp, devoured in the same Manner as if nothing had been done to it, and utterly eaten to Pieces. The best Preservative of all, is to sprinkle Lye over the Seed-Corn after steeping, and then to sift Lime over it, and sow it, well covered, with both. These Tastes continue with it longer than others, and are therefore more effectual.



C H A P. IV.

Of Slugs.

WE have named the principal Destroyers of Crops while in the Ground; and are now to consider the Devourers of them when they have sprouted: and of these none is so fatal, so numerous, or so hard to be conquered, as the Slug.

By this Name the Farmer expresses the naked Snail. It is of two Kinds, a large black and a small brown one. The black is the greatest Devourer; but the other is more apt to escape Destruction, because unseen, by being small and of the Colour of the Ground.

These are so very fruitful a Creature, that they will, in Places where there is any Shelter near, encrease faster than it is possible to destroy them.

A Gentleman of Veracity, who has a single Acre of Garden, assures me that he has, one Day with another, kill'd with his own Hand, sixty or seventy of these Creatures, Morning and Evening, during the Summer, for these twenty Years, and yet he finds to this Day as many as ever.

In Gardens these Creatures eat the Hearts of new-planted Kitchen-Herbs; but in Fields they get a little within the Surface, and eat the first Shoots of the Crop.

The Stalk which is to support the Ear, together with the Rudiment of the Ear, and of every Grain it contains, lie in this first Shoot, and this is eaten off by these mischievous Creatures.

The small brown Slug is most destructive of Wheat and other Grain; the great black Slug of Pulse.

The steeping of Seed-Corn is of no Benefit in this Respect, because no Taste from those Ingredients gets up to the Shoot. Therefore other Defence must be thought of against these Enemies.

Experience shews they are most frequent on Land manured with Dung; and that fewest of all are found where the sharpest Manures are used, such as Lime, and the like.

Of all the Tastes that can be thrown among them, two are found most disagreeable to them; these are Lime and Soot.

This will give the Farmer his first Instruction against them.

He knows the Time when they will come to be mischievous, and he has before him the Ingredients that can do most to prevent it.

Let him have some fresh and strong Lime ready; and about eight Days after the sowing of the Corn, let him have one or more of his Chimneys swept for Soot. Let him mix together equal Quantities of the fresh Soot and Lime, and sprinkle it over the Ground.

This will greatly promote the Strength of the Crop, and at the same Time poison Multitudes of these Vermin.

If he can have the Advantage of a Shower about this Time, let him by all Means order the

Soot and Lime to be thrown on soon afterwards: if not, the best Time is very early in the Morning; because they are then out, and upon the Surface of the Ground. The Lime falling upon their Bodies, kills them; and the Taste and Effect of it will remain several Days upon the Land, as a Preservative against those which have escaped.

In small Pieces of Ground, a Mixture of Soap-Lees and Tallow-Chandlers Greaves, destroys them utterly.



C H A P. V.

Of Grasshoppers.

THESE are Enemies of which the Farmer is not so much aware, as of many others which do him less Damage. They are not so common in his Crops as the rest, which are in a Manner universal; but where they come they are extremely destructive.

They feed upon the Shoot as soon as it appears above the Ground, and are very mischievous to the Summer-Corn, and other late sown Crops. They eat these down so very deep, that frequently there is never another Shoot made, but the Grain dies, rotting in the Ground.

The Remedy against these Creatures is of a peculiar Kind. It is found that they cannot endure the Taste of Bitters of any Sort. This is not singular; for many Insects beside these, and even small Birds, are destroyed by those Bitters, which we take with Safety and Advantage, in the same Manner as if they were the most fatal Poison. An Infusion of Gentian will kill most of the small Birds; yet, to us, it is a very wholesome and excellent Stomachic: on the other hand, there are Worms that feed on Pellitory of Spain, which is so hot we cannot endure it in our Mouths without Pain.

The Farmers who have, from Father to Son, a Tradition of this kind, boil Wormwood in Water, and sprinkle it over those Crops which the Grasshopper is devouring. But there is a much more powerful Remedy.

Coloquintida is the most hateful Bitter in the World; and a very small Quantity of it will give its Taste to a vast deal of Water. This should be sprinkled on the Crop, and will never fail.



C H A P. VI.

Of the Locust.

THE Grasshopper naturally leads to the Locust, as it is only a smaller Animal of the same Kind; but this terrible Destroyer we are little acquainted with in BRITAIN. We were threatened with a Swarm of them some few Years since; and, as it is possible, they may come at some other Time, tho' we have all the Reason imaginable to hope not, it may not be amiss thus shortly to mention them.

They devour the green Crop of any Kind,

and in any Degree of Growth; and when they come in such Swarms as to cover the whole Ground to a great Depth, there can be no Remedy. If they should ever threaten our Crops, it would naturally be in a less Quantity; and the Preservation would be in the Method just directed. Coloquintida should be boiled in Water, and the Liquor sprinkled over the Field. This would indeed be worth a Tryal against other Insects, particularly in Gardens; but it is not yet recommended upon Experience. It is a Taste so extremely nauseous, that probably no Creature would eat any thing wetted with it.



C H A P. VII.

Of the Caterpillar.

CATERpillars are of innumerable Kinds, like the Beetles and their Maggots. They are the Young of the Butterfly-Species, and are as various in their Form, Size and Colours, as those winged Parents from whom they spring.

The Butterfly is directed by Nature to lay her Eggs upon some particular Plant; and there the Caterpillars are hatched. This Plant is to be their Food, therefore the Farmers and the Gardeners Crops suffer most because they are well tasted: and the Creature devours immoderately, and does vast Mischief.

After it has lived the appointed Time in this State, it spins a Web; and in that waits the Change into a Butterfly: thence it issues, like the Parent Animal, to lay the Foundation of another Brood.

Trees suffer as much as smaller Plants by these Creatures; they will eat up the whole Quantity of their Leaves sometimes in a very short Time.

In the Fields the Pulse-kind are most subject to them; and it is very essential to guard against them.

In Plantations of Trees their Nests should be sought, after the Leaves are fallen; for many Kinds of them breed in this Manner in great Numbers, the Eggs remaining in the Nest or Bag all the Winter, and hatching just when the Leaves come out in Spring.

These Nests are generally at the Extremities of the Branches of young Trees, and the best Method is to cut off the Tip of the Branch and destroy them.

In Fields they have not this Course of Breeding, for what suffer most by them are the Summer Crops. When the Farmer sees them in any Number, or perceives by their Havock that they are numerous enough to do him Mischief, his Remedy is this:

Melt some Pitch in an Earthen Pipkin, and put to it some Flour of Brimstone. Let it cool, and divide it into several Lumps.

Place small Heaps of Straw in different Parts of the Field, and on each lay one of these Lumps of the Pitch and Brimstone. Set Fire to the Straw, and the other Ingredients will melt and burn among it; and every Caterpillar that

is within the Influence of the Smoak, will fall off and perish.

If once be not sufficient, the same Practice may be repeated; and if the Farmer be diligent, he need not fear Success. The Art is disposing the Heaps in such Manner, that no Part of the Ground may be free from the Smoak.

In Gardens and small Plantations of any kind use the following Method.

Boil some Tobacco in Urine, and add to it some Soap-Lees. Sprinkle where the Caterpillars are, and it will destroy them.

C H A P. VIII.

Of the Grub.

WE have informed the Farmer in general, that the Grub is the Worm or Maggot produced by the Eggs of the Beetle. But there is one particular Kind of this Creature more destructive than the rest; and when the Grub is mention'd without any particular Distinction, this Kind is meant.

This is a thick, short, whitish Worm, with a hard red Head, and six short Legs. It is found among the Roots of Barley and other Corn, and does prodigious Mischief; eating off the first Shoot just above the Husk. It feeds on the sweet Matter of the Corn, which is at that Time a kind of Pap, like Cream; and leaves the Shoot to wither, and the Body of the Seed to decay.

This mischievous Creature is the Produce of that Insect we call the Cock-chaffer, which is so abundant in Hedges in Summer-Evenings.

It is an endless Task to think of destroying the Grub, because it lies at some Depth under the Ground; but there is no great Difficulty in preventing the Danger, by destroying the old ones, to whose Eggs the next Brood must be owing.

We have directed the Farmer to defend himself against Beetles in general, by making a great Quantity of a stinking and smothering Smoke; and the same Method is to be practised here.

He is to burn wet Stubble under all his Hedges; and he will by this Means certainly either destroy or drive them from his Grounds.

C H A P. IX.

Of Flies.

THESSE are as innumerable in their Kinds as the Beetles or the Caterpillars, and no Insect is more destructive of the Farmer's Crops.

We have already spoken of the Damages they do to Turnips, and to other young Shoots of useful Plants, under the several Heads where those Articles are treated of at large; we shall therefore refer the Reader to their proper Place for these particular Considerations; but shall here give a general Account of this destructive Creature, and mention those Particulars which have not occurred before in their

Place; and with this close the Account of the Farmer's Insect-Enemies.

Among the Fly-kind those which are the most conspicuous are the least hurtful. The larger Species being, for the most Part, harmless; and the smallest, in the highest Degree, mischievous.

The Dragon-Fly, of which we have many beautiful Species, frequent about Waters, and which the Ignorant have distinguished by the Name of the Horse-stinger, has neither that, nor any other Hurt in its Disposition: a harmless Insect, form'd to wanton in the Fields of Air, to amuse us with its Beauty, and the Rapidity of its Flight; and to do nothing to injure us. Its Brood are hatched in the Waters, where they are the Prey of Fishes, but never come in the Way of doing Mankind Damage.

It is much the same with the rest of the large Kinds of Fly. They wander from Place to Place, and feed at Random upon lesser Insects, or upon useless Vegetables: but it is much otherwise with the small Sorts. They herd together in innumerable Drones, settle upon the Boughs of useful Trees or Plants, and destroy and pervert the Course of Nature by their Sucking.

Wherever these appear, the Method for destroying them is by proper Smoaks; for nothing else can properly and perfectly reach them; but there are Ingredients to be used in this Manner, which spread their Effects so far, and operate so powerfully, that it is scarce possible for these Destroyers to escape or to support themselves against their Influence.

Books written on these Subjects, abound with Receipts for Liquors to sprinkle over Plants covered with these little Destroyers; but these are trifling to the Method by Smoak, which is to be sent among them much more easily, and spreads its Influence more universally.

For the Destruction of Flies of a larger Kind, that have seiz'd upon a Crop, a Quantity of Feathers may be burnt among wet Straw, and these give so offensive a Flavour to the Smoak, that the Creatures will sometimes be driven away entirely; but oftener, when only driven away thus, they return again. The Method that is therefore most eligible, is to kill them.

The Smoak of Brimstone is, beyond all other Things, efficacious to this Purpose: there is a suffocating Steam attends it which no Creature can endure.

This is therefore very proper when it can be used conveniently, but it does not spread its Effects far. A few Matches burnt under a Place where there are a small Parcel of these Vermin, will stifle them all, but there is no spreading the Influence of this over a whole Field.

As Sulphur is confined in its Sphere of Operation, there is a Drug called Orpiment, that is, of all known Substances, the most extended; and, happily for the Farmer, the Smoak of this is offensive beyond all other Things.

A Dram of this will make as much Smother as a vast Quantity of Straw, Stubble, or any other such Material; and the Smell is like that of Garlic, only vastly more offensive.

This is the Farmer's best Safeguard against the Fly which seizes innumerable upon many of his Crops. He need not be afraid to use it, from

its having been called by some a poisonous Substance; for that arises only from an Error: it is a common Thing to call yellow Ratsbane by its Name; but that is a Thing altogether different. Yellow Ratsbane is made by Art; but the right Orpiment is found natural in the Earth: and the Farmer's great Care must be to purchase it of an honest Person, and to explain what he does, and what he does not mean.

There needs no Addition to this; and there is very little Trouble in the using it.

Let the Farmer who has Crops over-spread with these Destroyers, take the Advantage of a Day when there is a little Wind; and place himself so that it may convey the Smoak he shall

make directly upon his Crop. Then let him light a few Pieces of Charcoal, and set over these a Fire Shovel with an Ounce of Orpiment beat to Powder.

There will presently rise from it a thick white Smoak, of a most offensive Smell. He will not be incommoded by it, because the Wind drives it from him; but it will spread over a vast Space of Ground: if the Field be small once burning will do; if larger, it may be repeated in two or three Places.

I have seen this tried in different Instances, and with various Effect. It hurts no Crop, and most Kinds of Flies are destroyed by it; but there are some it does not kill.



BOOK XIV. SECT. II.

Of Damages from larger Animals.

CHAP.

1. *Of Mice.*
2. *Of Moles.*

CHAP.

3. *Of Birds.*



CHAP. I.

Of Mice.

FIELD Mice are as numerous as those of the House, and the Farmer often finds them as troublesome, and sometimes much more so. There are several Species of them; but they are all equally his Enemies: all feeding upon his Seed-Corn and Pulse in the same Manner; and are all to be destroyed by the same Means.

Drier Lands are more subject to this Kind of Vermin than those which lie wet; and of all the Kinds of sowing, that under Furrow most exposes the Seed to them.

In this Case, as the Furrows will fall somewhat hollow; they afford a Shelter to the Mice at the Time of their committing all their Havock.

The Farmer seems to contrive for their feasting and Safety together in this Method; for the Corn or other Seed lies perfectly exposed to them, and they are not exposed to his Eye while they are feeding upon it.

In these Lands I have with great Concern often traced the Path of those Devourers, and seen all eaten up, or carried away to some little Distance: for under the Covert of this Manner of Tillage they will make their Nests and Granaries as it were in different Places; and the Seed shall be found stored up in one of these, that should have covered a great Space of Ground with its Shoot.

The Husbandman will by this see a great Disadvantage attending that Kind of Tillage; and he will know in what Fields he is most to fear these Enemies.

Though this Manner of sowing gives the Mice an Advantage, the other Way does not sufficiently secure the Corn from them. When it is sown in the common Way and harrow'd in, it is better covered; and there is a great deal more Trouble for them to get at it: but they are very

industrious, and in this Case will dig after it, and tear up and destroy a great deal.

When it is sown under Furrow they begin with it as soon as it is in the Ground; but when it is harrowed in they wait for its first Sprout. This gives the Farmer an Advantage, because he knows exactly when he is to expect them; and it is a great Article of Safety to know when to guard against the Danger.

The careful Husbandman is not in this Case to wait till he sees the Shoot of his Seed; for the Mice have very quick Eyes, and they will perceive it a Day or two before he does: he is therefore to look to his Ground a Day or two before the Time of its being seen covered with the young Shoot; and then, as he knows the Devourers will be about, he is to prepare for their Destruction.

Traps are a very poor Method of getting rid of these Creatures. There is no Way well worth his Consideration but Poison; and happily for him there are Drugs which will answer this Purpose of Poison to these Creatures, which are not literally and strictly Poison to ourselves. These he is to use, and they will sufficiently answer his Purpose. It would be a disagreeable Thing to be meddling with Ratsbane; but there is no Harm in handling the Ingredients he has to use.

In the first Place let him consider what Fields from their Soil are most likely to harbour Mice, and in what Places he has known them most mischievous. Let him never sow these under Furrow, for that takes from him all Opportunity of attacking his Enemies: they work under Ground as it were, and will never come into the Way of his Poison.

When these Fields have been sown otherwise, and harrow'd over, the Mice must come upon the Surface and dig down for the Corn, and they will then certainly meet with any Thing he lays on the Ground for them.

Let him mix up a Peck of Barley Meal, a Pound of Powder of white Hellebore Root, and four Ounces of Powder of Staves-Acre; and when these are all mixed together by sifting through a coarse Hair Sieve, add half a Pound of Honey, and as much Milk as will work the whole into a Paste.

Let this be broke into Pieces, and scattered over the Field at the Time when the Mice are known to be coming. They will eat it greedily, and it is certain Death to them. There is nothing in any of the Ingredients disagreeable to the Taste when thus mixed; and every Morfel of it will be devoured. The Mice will be kept from digging after the Corn; and at the same Time killed by the Ingredients.

This is the Method to be used just at the Time of Danger; but the Farmer who has a Field pestered with these Vermin, will do well to be thinking at other Times also of destroying them.

They live at a small Depth under Ground, and there breed in Abundance. The Passage into their Nest is by a little round Hole, and these are easily seen in dry Weather.

On these Occasions the Farmer should go his Rounds with a Quantity of the Paste before directed; and wherever he sees a Hole throw in a Piece. A little Trouble of this Kind taken from time to time in the Heat of Summer when the Holes are most conspicuous, would utterly root them out.



C H A P. II.

Of Moles.

TH E S E are subterranean Enemies of another Kind; but in their Way do as much Mischief as the former. We see their Hills in Pastures, where they work under Ground at a strange Rate, and are very hurtful; but the Damage they do to Corn is much greater; and frequently comes upon the Farmer quite unexpectedly. He knows that the Ants and the Mice will eat the Grain when newly sowed, and that the Slugs will destroy it when just shot up; but when these Times are over he is at Rest on those Heads. On the contrary, there is no Time at which the Mole may not destroy his Crop.

This Creature formed for living under Ground preys upon the Roots of Plants, and is fond in a particular Manner of those of Corn; but beside the Quantity they destroy by eating, they damage a vast deal more by undermining the Ground. 'Tis hard to be conceived what Havock one Way or other a single Mole will make in a Field of Corn; or in how little Time, one of these Creatures will burrow through a third Part of an Acre in a Day; and this perhaps at a Time when the Corn is half grown.

The driest Lands are the most subject to these Animals, but they will get into any; and there is no Creature of all the Number to whose Injuries the Farmer is exposed, against which it is so difficult to guard. There is no foreseeing when they will come; but it is very important to know of their being in the Ground as soon as possible, in order to stop the Destruction.

Numb. LX.

The only Caution in the Farmer's Power is to observe whether there are any there at the Time of plowing; and if there be, he is to use every possible Method of destroying them: if not, he is to examine whether the Lands nearest his own every Way be infested by them, or clear from them.

The freer they are they more likely he is to be clear of them; but there is no Certainty from this; for there are Times when they will come without any possible Manner of guessing from whence; and they will sometimes have done irreparable Mischief, before 'tis discovered they are in the Place.

The next Caution to this of knowing when to expect them, is the destroying them when found. They are a very defenceless Creature, and not very cunning. Their only Security is the being hid under the Surface; and they betray themselves in that Retreat by the Manner of their working.

The Husbandman, whose Crop is suffering by them, is to look for the Tracks where they have gone; and these he will easily see by the different Colour of the new turned up Earth.

He is to follow the Course of one of these Passages, when he has got Sight of it; and he is to dig cross Holes in it, and to watch the going out or coming back of the Mole. And wherever it is casting, to strike it through with an iron Instrument made for that Purpose. The Traps for catching them are also common, cheap, and of a plain Structure. Indeed the Destruction of this Creature is so easy, and so many are ready to undertake it at a trifling Price, that the Caution we first gave is the most important; which is the finding as soon as possible where they are growing mischievous.

In some Places the Farmers content themselves with driving them out of their Fields; and this is to be done by smoaking them, as other Creatures of a lesser Kind are destroyed.

To this Purpose they open their Passages in several Places, and burn Heaps of Straw and some Brimstone. This will drive the Moles out of a Corn Field speedily enough; but this is not a safe or eligible Method. It is only sending them out of ones own Ground into ones Neighbours, who may in the same Manner drive them back again. This is only a temporary Relief; and there is none wise or effectual but their Destruction.



C H A P. III.

Of Birds.

WE have gone through the Insect and creeping Tribe of Enemies to the Farmer; and come to the flying. These are as hurtful, and they must be guarded against by other Means. Those who are unaccustomed to these Things will be surpris'd to see to how many Accidents, and to what a Variety of Devourers, the Husbandman's Crop is exposed. They will wonder any Care preserves it from them; but certain it is that Care is necessary, or there will be but a poor Chance of escaping them.

Corn is open to a vast Variety of Birds, larger

and smaller, from the Crow to the Sparrow; and they are continually seeking after it, from the Time it is out of the Seedsman's Hand in the Field, to the housing it up in the Granary.

The small Birds will follow the Sower, and one would think they would devour it as fast as it comes from his Hand: from that Time they are daily seeking after every Grain that does not lie too deep for them; and they will in Spite of the best Care eat a great deal.

When it is about to shoot, the fly Rook comes in. He perceives, as we have observed, the first Spire that gets above the Surface, before the Farmer's Eye sees the least Appearance of it; and he tears up a great deal. There is no Seed the Farmer sows that is not a proper Food for these Devourers. They fall upon all alike, and happy for the Husbandman it was, that in the old Way of sowing, a great deal more Seed was allowed than was needful for the absolute Growth.

The best Defence and Safety against these Devourers is the new Method of Husbandry.

Drill sowing gives great Security to the Seeds in general; and it limits the Time of the Danger of its being devoured, so that it is much more easy and cheap to protect it.

There is nothing of all that Loss of the Seed as soon as thrown from the Hand; nor can these rapacious Creatures pick it up Day by Day afterwards as it lies exposed; 'tis covered by that Practice, and the sole Danger is just when it begins to peep above Ground. If a Boy or two be employed just at that Time to fright the Birds away, it is naturally secure at all others.

The steeping of Seed is another Defence against Birds; for they will hate the Taste and neglect it.

A good Custom would be to let a Person follow the Seedsman in the common Way with a Pistol, discharging it frequently among the Clusters that

follow; hanging up any he chances to kill on a Stick by the Way.

This will defend the Seed in some Measure as sown; and the same Practice will be useful afterwards when it begins to sprout.

This will be needful whatever Method of Husbandry has been followed; for the Rooks and other Birds will tear up the Seed from any Depth where they see its first Shoot.

Therefore about a Fortnight after the sowing of Barley and other Summer Corn, and about six and twenty Days after the sowing of Wheat, Rye, and the like, in Autumn, let a Couple of Boys with Pistols be sent into the Field. Guns are unmanageable for such Persons, and the killing is not so much the Purpose as the frightening. Any Servant of the Farmer's may with a Gun kill a Crow or two, or half a Dozen Sparrows, in any other Place, and they may be stuck up in the Field. The Boys need only fire Powder, and they will thus weary and fright the Birds away.

This Method and no other will defend the young Crop. It is but for a few Days that it is required, and no Servants the Farmer employs in his whole Profession so well earn the Price he pays them.

Morning and Evening are the Time of Birds feeding. The Boys must be sent into the Field an Hour before Sun-rise, and must stay half an Hour after Sun-set; and these are the Times when they must be most vigilant. In the Middle of the Day there is least Danger, and the most Damage of all is done at Day-break.

We have thus given the Farmer a general View of all the Dangers to which his Crops are exposed from Animals; and the Methods found most successful in preserving and defending them against them.

One farther Damage there is to which he is exposed, and this is from other Plants: of this we are to treat in the ensuing Chapters.



BOOK XIV. S E C T. IV.

Of the Damage from W E E D S.

CHAP.

1. *Of the Nature of Weeds.*
2. *Of the several Kinds of Weeds.*

CHAP.

3. *Of clearing the Ground of Weeds.*



C H A P. I.

Of the Nature of Weeds.

WHEN the Farmer has been at the Charge of enriching and tilling his Ground, he expects the Advantages of his Labours and Expence; and wishes the Improvements he has made in the Land may give all its Fertility to his Crop: but he is to consider Nature sows while he is sowing; her Provision for keeping up the Species of Plants is very wonderful; their Seeds are scattered to great Distances, and where they fall they grow. While the Seeds of some Plants are winged with Down to make them

float upon the Air, the Roots of others are so full of Life, that the least Morfel of them remaining in the Ground will grow.

'Tis not with Plants as with Animals: in these the Loss of a Limb or other essential Part cannot be restored, except in some few particular Kinds: but in Plants, while any thing remains the whole will be renewed.

Hence is the Origin of Weeds to be trac'd by the Farmer, and hence he will find them universal.

He is according to this distinct Manner of their Growth to divide them into two Kinds: the Perennial, or those which commonly rise from

Annual Weeds



Charlock



Poppy



Corn Marygold



Melilot



May Weed



Cockle



Sow-thistle

Perennial Weeds



Rest-harrow



Colts-foot Leaves



The Colts-foot Flower



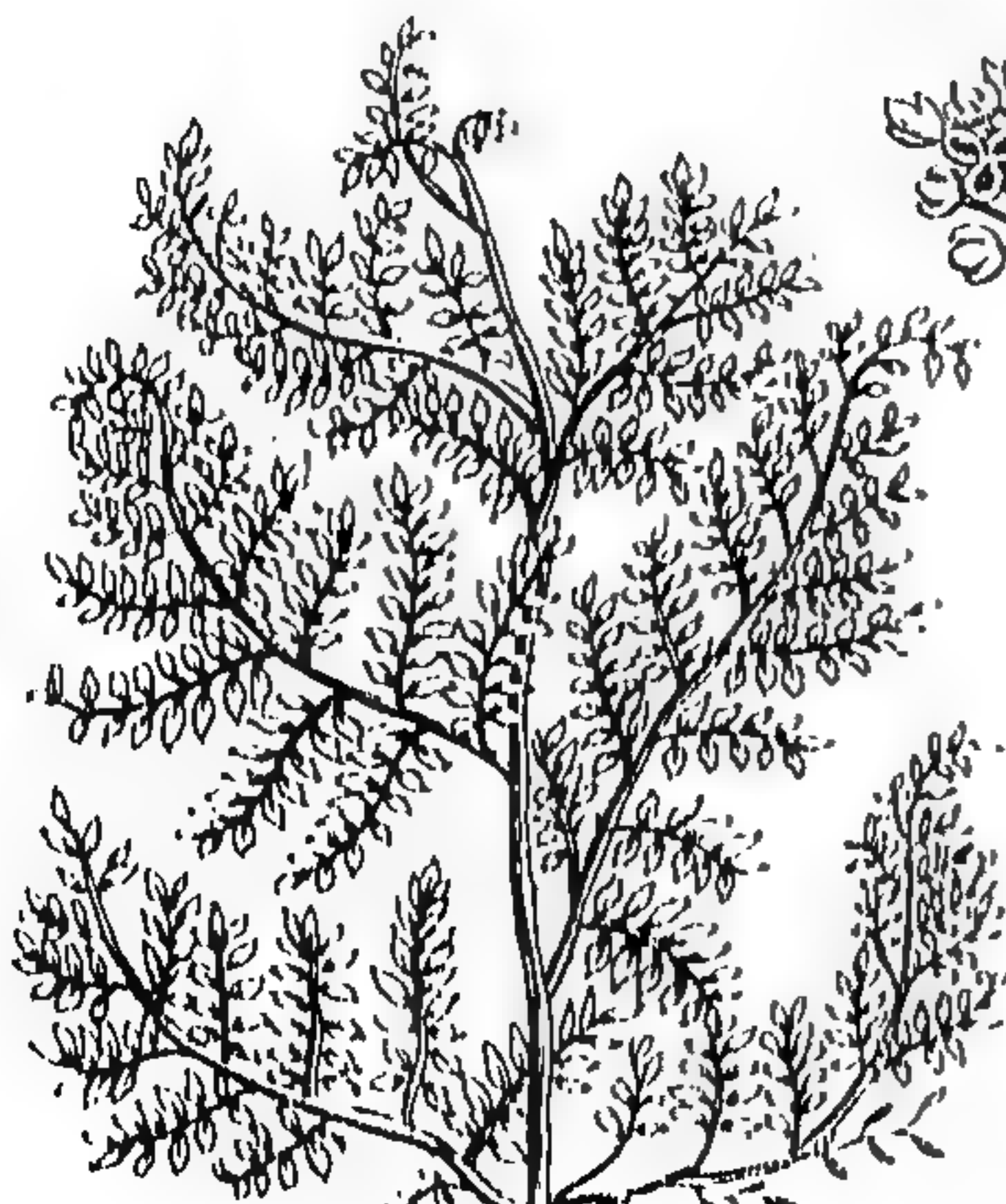
Couch Grass



Thistle



Spear Thistle



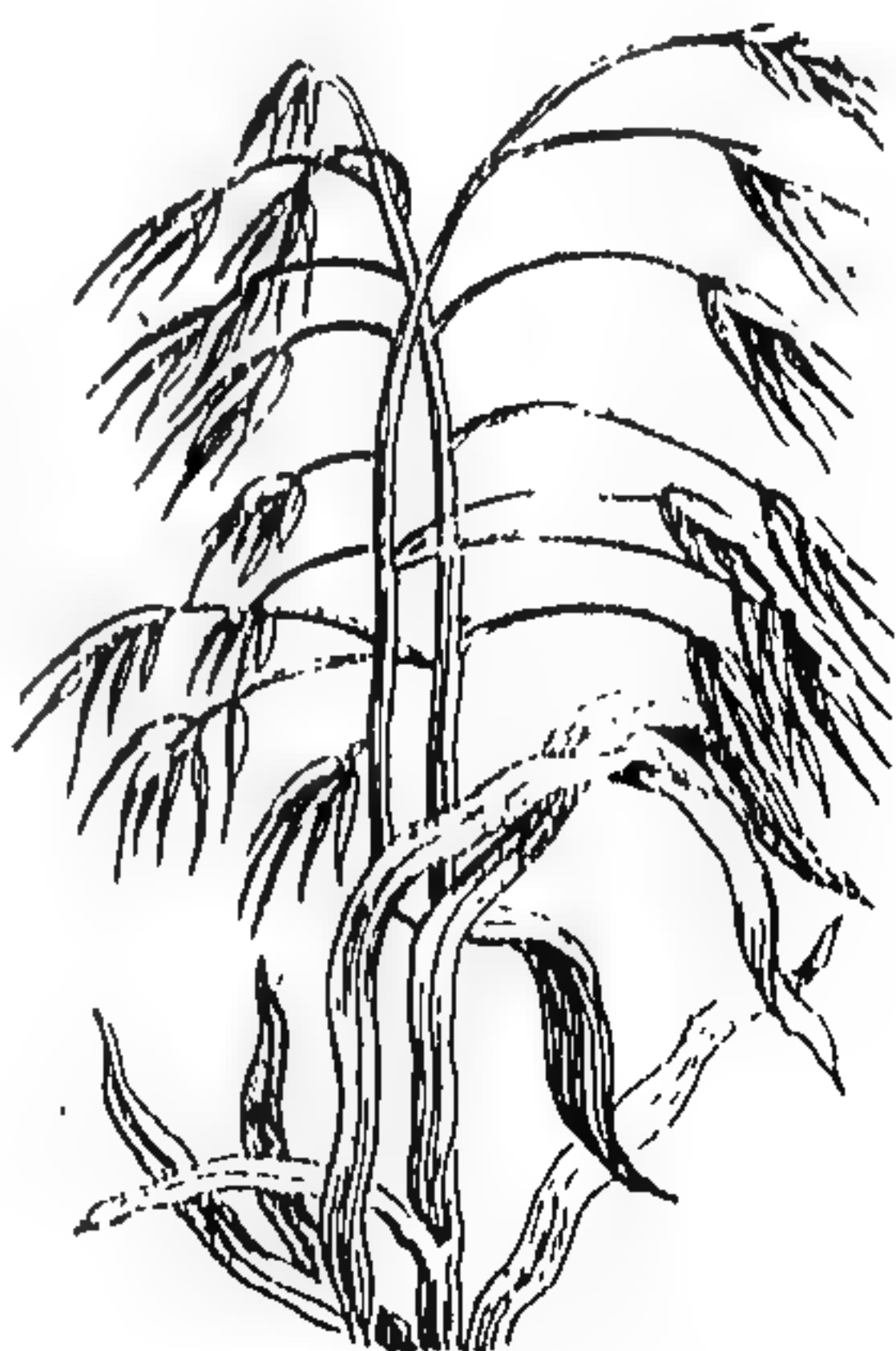
Fern



Broad leaved Garlic



Crown Garlic



Wild Onion

from Roots left in the Ground; and the annual, which spring from Seeds brought on by the Winds.

A perennial Plant is one whose Root lives through the Winter, and shoots afresh in Spring. The Seeds of these may be brought on by Winds; but they are most pernicious when they rise from Roots; the Mischief lying deeper, and the Plant being stronger.

The annual are such as rise from scattered Seeds: these flower during Summer, and die when they have perfected their own Seeds, which Nature scatters for a succeeding Crop.

From this Distinction the Farmer will see they are to be the Subjects of different Treatment. The perennial Weeds ought to be got out in the tilling of the Ground, their Roots being torn up by the Instruments: the annual are to be cleared away by a particular Practice afterwards; that is by hoeing: for they are not in Being when the Tillage is performed.

Beside the Effect of Wind in bringing Seeds of these Plants upon the Ground, there is another Source from which many rise: this is from Seeds buried there in former Tillage.

The Seeds of these, like those of better Plants, will not grow unless they are near the Surface; but many of them will continue good when buried at a greater Depth, and grow when they are brought nearer the Air by Tillage.

The Farmer will see from this it is impossible to guard against Weeds, and that his Point must be to destroy them.

Every Method of right Husbandry assists in reducing their Number; but none can utterly destroy their Seeds or Roots.

The better Fences are kept up, the fewer Seeds will be brought into the Grounds; because the greater Part of those that are brought by the Winds, are stopped by the Leaves, and fall there. This is the Reason why Hedge Bottoms are, in Spite of their sheltered Condition, always so full of Weeds.

In the same Manner the better Tillage is used, the more the Roots of perennial Weeds will be torn up and taken out of the Ground; but in all this there will be still Room for some Encrease.

Some Seeds will come in, and some will be ripened upon the Spot; so that notwithstanding the best Care that can be taken to prevent their Growth, a great deal will also be required afterwards to destroy such as rise.

Weeds are in this Manner to be expected in all Places; and they will out-grow all Crops.

This rises from a plain Reason: they are Natives of the Soil and Climate; and will therefore thrive better in it, than such as are raised by Art.

It is a great Advantage in the Drill and Horse-hoeing Husbandry that they can from Time to Time be destroyed as the Crop is growing; and that every Time they are cut up the Ground receives a Kind of Tillage.

In the common Method they grow with the Crop; and as they are naturally more vigorous, they draw the greater Part of the Nourishment from it.



CHAP. II.

Of the several Kinds of Weeds.

EVERY Thing that grows without being sown or planted, among a Crop that has been sown or planted, is in that Place a Weed. The whole Benefit of the Tillage was intended for the Crop, and this robs it of a Part.

In general those Weeds are most numerous which rise from Seeds; and those most difficult to be extirpated which come from Roots. *Sow-thistles* in Fields, and *Groundsels* in Gardens, are an Instance of the first Kind, and *Restharrow* of the latter; a Plant whose Root is so tough that it will impede the Progress of the Instruments according to its Name; and so full of Vigour in every Part, that the least Morsel slightly covered will grow.

But there are some which have both these ill Qualities of propagating quickly and abundantly by their Seeds, and spreading and rising also from their Roots.

Coltsfoot is an Instance of this Kind, its Seeds are winged with Down like the *Groundsels* or *Sowthistles*, and the Root is as tough and full of Life as that of *Restharrow*; these are the most pernicious of all.

Couchgrass propagates almost entirely by the Root; but it spreads so fast and so far, that nothing is more prejudicial.

From this Review of the several Natures of Weeds, the Farmer will know how he is to conduct himself in this Respect.

Let him when he is about to enter upon the Tillage of a Piece of Ground, consider what are the Weeds upon it, and by that determine his Method of working: for all Lands the Horse-hoeing Husbandry is preferable in this Respect to the other, but most of all where the Ground is over-run with perennial Weeds. Let him take Care he know these by Sight, and understand what he is to do by their Appearance.

If he sees the *Common Way Thistle*, this is one of those of the worst Kind, its Roots creeping and spreading, while its Seeds fly by Means of the Down.

Fern is another terrible creeping rooted Weed; and *Melilot* is hateful, not only by its abundant Propagation, but its abominable Flavour. Such as this hurt the Farmer two Ways; they impoverish his Crop, and give an ill Condition to the Grain. Wild Garlick does the same Damage.

Wherever there are an Abundance of these Thistles, and such other of the rooted Kinds, let the Farmer understand that the Ground will cost him much more Expence than under any other Condition, whatsoever Method he follows; and that his best Practice is to tear it up with the four coultered Plow, to harrow away the Roots immediately after every plowing, and to work it up by the Drill and Horse-hoeing Method.

This will in a few Years perfectly clear it of the worst Weeds that can infest it, be they ever so abundant; and if he follow any other Practice, they may remain Torments to him throughout the longest Lease.

The

The deep Plowing we have directed, and the repeated Harrowings will tear up and draw off a very great Part of these Roots; but as any small Fragments will grow and soon encrease to any great Length, they would after this, be all the Care possible employed in it, rise among the Crop, and strengthen themselves in the Ground during its Growth: whereas in the Horse-hoeing Method, the very smallest Fragments as soon as they begin to grow will be torn up and thrown out in the Intervals, and very easily cleared from among the Rows of the Crop; and as these Intervals of the present Year are to be the Places of Rows of Crop in the succeeding, it cannot be but that the Ground must in a few Seasons be perfectly cleared from them.

We have upon many Occasions, and for various Reasons, strongly recommended this Practice in the preceding Parts of this Work; and we cannot but add this as one very essential Pre-eminence it has over the common Method, or any other ever brought into Use.



C H A P. III.

Of clearing the Ground of Weeds.

THE Consideration of Weeds is very essential to the Husbandman, because scarce any of his Land escapes from being abundantly infested with them; and none is ever entirely free. They utterly destroy some Crops; and they never fail to injure others in Proportion to their Number and Nature.

The Hand-hoeing will, in some Cases, answer the Purpose with the annual Weeds, as the Horse-hoeing does with the others; but even this, in the common random Way of Sowing, is a Thing scarce practicable.

We have told the Farmer what he is to do in a Land over-run with the perennial Kind; and we shall suppose him now about to undertake a Piece that is tolerably free from these, but is abundantly covered with the annual ones. In this Case, as well as the other, the Horse-hoeing Method is vastly preferable to any other, because it not only effectually destroys such as rise after the Sowing, but makes them useful as a Manure: but if the Farmer is averse to this, let him take a middle Course.

Where he sees this abundant Growth of Annual Weeds, he may be sure there will be a proportional Increase among his Crop: they must be destroyed, or they will starve his Corn, by drawing to themselves the far greater Part of the Nourishment: in the common random Way of Sowing, nothing is so difficult as to get out Weeds in the Growth; but in this Case it would be impracticable: therefore if he will not admit the Hoe-Plough into wide Intervals, at least let him sow by the Drill with somewhat narrower, that his Crop may stand clear, and well distinguished from the wild Growth; and that the Hoers may easily and conveniently clear the Ground between the Rows with Hand-Hoes.

This is an Improvement of the common Practice, and will be of great Service; because the Hoers, while they clear the Intervals be-

tween the Rows, may also draw up the Weeds by Hand that grow among the Crop in the Rows; but this is by no Means comparable in the Effect to the other Method.

The Hand-Hoers leave Parts of the Roots in the Ground, and after the first Shower there is a new Crop of the Weeds; but the Horse-Hoe, tearing up the Roots, admits of no such speedy Return.

These are the Methods the Husbandman will find most successful; but if he be so devoted to the old Method, that no Prospect of Advantage can lead him out of his beaten Tract, then his proper Recourse must be to a Summer's Fallow; and this must be carefully observed. The more the Ground is infested with Weeds, the more Care must be taken in the turning up the Ground.

A dry Summer will destroy a vast Number of them, when they are thus from Time to Time torn up as they rise, and expos'd to the Sun; but there are Seeds that will lie under very little Disadvantages a whole Year without shooting, and on these the Fallow takes no Effect.

The wild Oat is of this Kind, and several others; for there are Plants whose Seeds naturally lie twelve or eighteen Months in the Ground.

These escape all the Farmer's Diligence in a Summer Fallow; they are not to shoot till the succeeding Spring, and then they come up with great Vigour, as if the fallowing had been a Preparation of the Earth for them.

Thus altho' a Summer's Fallow is the best Expedient the Farmer can use who will not follow the new Improvements, yet it is not to be compar'd in Efficacy to the Methods they offer for his Service.

It will destroy a great many Weeds, but the Horse-hoeing Method utterly extirpates all; and that without the Loss of the Season sacrific'd to the Operations of Fallowing.

We represent these Things to the practical Farmer as they are, on these repeated Instances; and hope the several Proofs of Advantages of various Kinds attending on the Practice of the new Method, will, when he sees them thus candidly laid before him, induce him to follow it.

The Seeds that lie this length of Time in the Ground, and escape by that the Summer's Fallow, are not the only Source of a succeeding Year's Growth of Weeds; a vast Number are brought in with the Dung and other common Manures, and the great Quantity beside rising from Seeds, waisted in by Winds, join in shewing that a Method of Husbandry which destroys them while the Crop is growing, must much more perfectly answer the Purpose, than one by which they are only kill'd before the Sowing.

Dung, which is the universal Manure in most Places, is composed chiefly of the Stalks of Corn; and, among these, there go into the Litter the Stalks of Weeds and their Seeds; therefore while the Farmer is enriching the Land for his Crop, he is also sowing Weeds to reap the Benefit of it.

These will be sure to rise in their full Number, and they will thrive upon the newly-enrich'd Soil abundantly. They can only be destroy'd while

while the Crop is growing, because they only grow with it. The Farmer will see by this, as by the other Instances, that there is no Way of destroying Weeds suited to his Purpose, or that can be effectual, but the doing it while the Crop is growing.

He is sensible of this; and in some Cases attempts it, by weeding among his Corn: but this is a Method the worst calculated for real Benefit of all that ever were introduced into Husbandry.

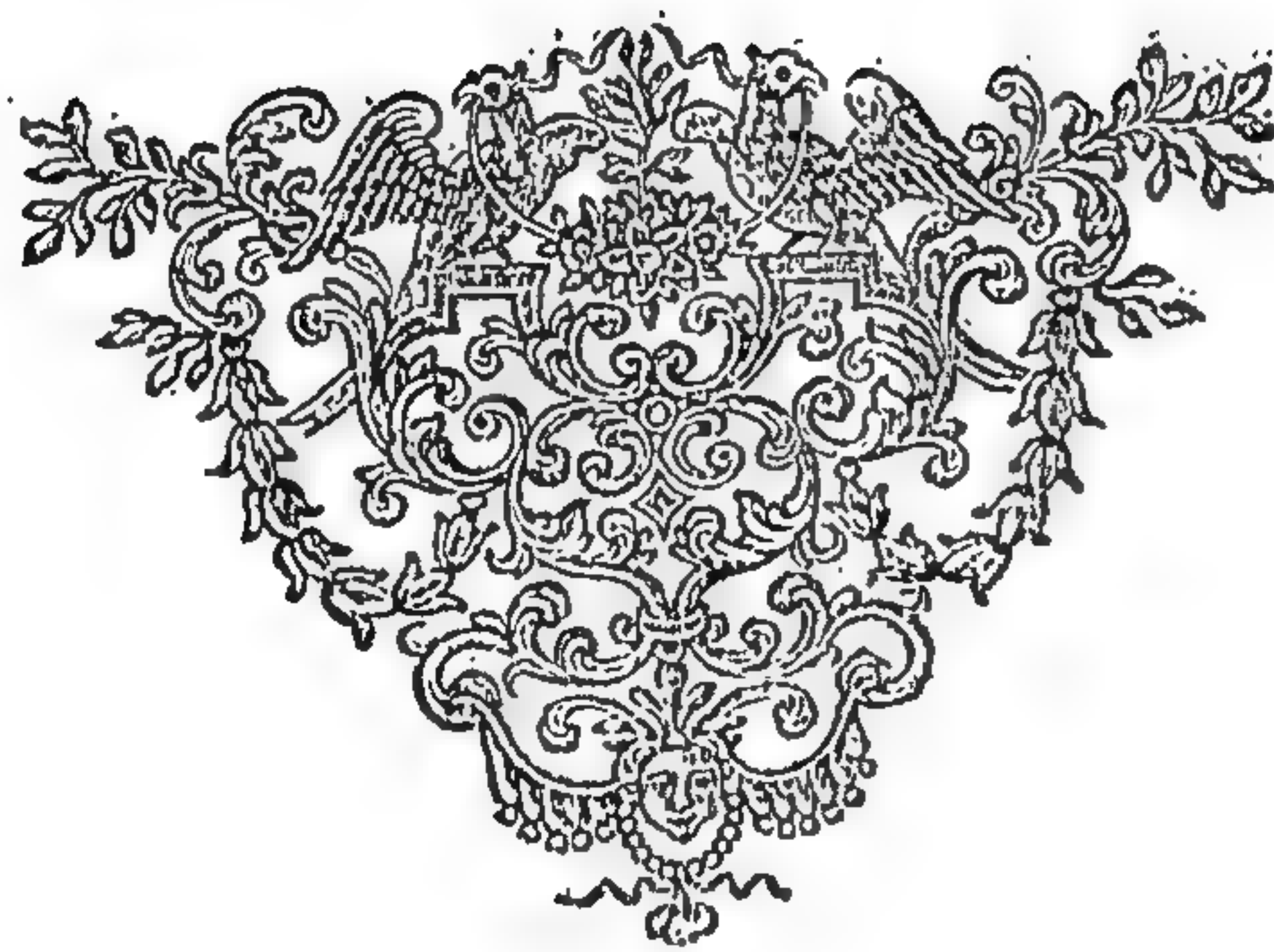
The Feet of the Weeders must do harm, and it is often more than their Hands do good. The Corn standing irregularly, there is no avoiding trampling some of it down; and in other Crops which more resemble Weeds in their first Shoot, there is beside the Damage of the treading them down, the Danger of tearing them up; and great Mischief happens both ways.

This is the Case with the annual Weeds, and it is still worse with the perennial: they cannot

be torn up, because that would tear up some of the Corn with them. All that can be done is the cutting off their Heads; the nearer the Root, the better; but still however near this is done, the Remedy is only slight, temporary and imperfect; the Root remains in all its Vigour, and new Shoots presently rise in the Place of the old one. These are commonly more numerous than the old, and consequently they draw more Nourishment. Thus what appears a Remedy, is, in these Cases, an Increase of the Disease.

All this is obviated by the Horse-hoeing Husbandry: that tears up and destroys all Weeds without any possible Damage to the Crop. This is plain to Reason, and it is found true by Experience; and with this last Recommendation, added to the many we have occasionally named before, we close this Part of our Treatise.

End of the FOURTEENTH BOOK.





A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK XV.

Of the poisonous and hurtful Plants native of this Kingdom.

IN TWO SECTIONS.

SECT. I. POISONOUS.

CHAP.

1. Of Henbane.
2. Of Hemlock.
3. Of Deadly Nightshade.
4. Of Water Dropwort.
5. Of Dogs Mercury.
6. Of Herb Christopher.
7. Of Water-Crowfoot.

CHAP.

8. Of Yew.

SECT. II. HURTFUL.

9. Of White Rot, or Cotyledon Palustre.
10. Of Red Rot, or Ros Solis.
11. Of Lousewort, or Pedicularis.
12. Of Spurge-Laurel.

THE INTRODUCTION.



WE have thus, in a compleat Course of the Practice of Husbandry, to the utmost of our Power, acquainted the Farmer with every thing he ought to know, and every thing he ought to do for the Success of his Business and Improvement of his Crops. We have occasionally, together with what he is to undertake, shewn him what he is to avoid, and there requires but the single Article we are here to treat of, to finish the Design; which, if the Execution have been at all proportioned to the Intent, and to the Assistances received for completing it, we hope will be a Benefit to the Public and to Posterity.

In treating of the Disorders of Cattle, we have mentioned their eating unwholesome Plants; and it is these we are to consider more at large in this Place. This Kingdom does not af-

ford many; but what there are the Husbandman ought to know, for the Security of his Stock, and of the young among his Family.

Instinct gives Creatures a general Direction not to feed on hurtful Things; but they sometimes neglect the Caution; Appetite in them, as well as in ourselves, getting the better of all other Admonition. To us who have Reason, this Instinct is not given; and while too young to exert it, we are in the Way of Danger; nor are we at any Time, without due Information, altogether above the Power of Accidents of this Nature.

It is for this Reason we shall here give the Husbandman the full and distinct Knowledge of what hurtful Plants will fall in his Way, adding to their Descriptions the Assistance of Figures, that he may destroy them wherever he perceives them rise.



Henbane



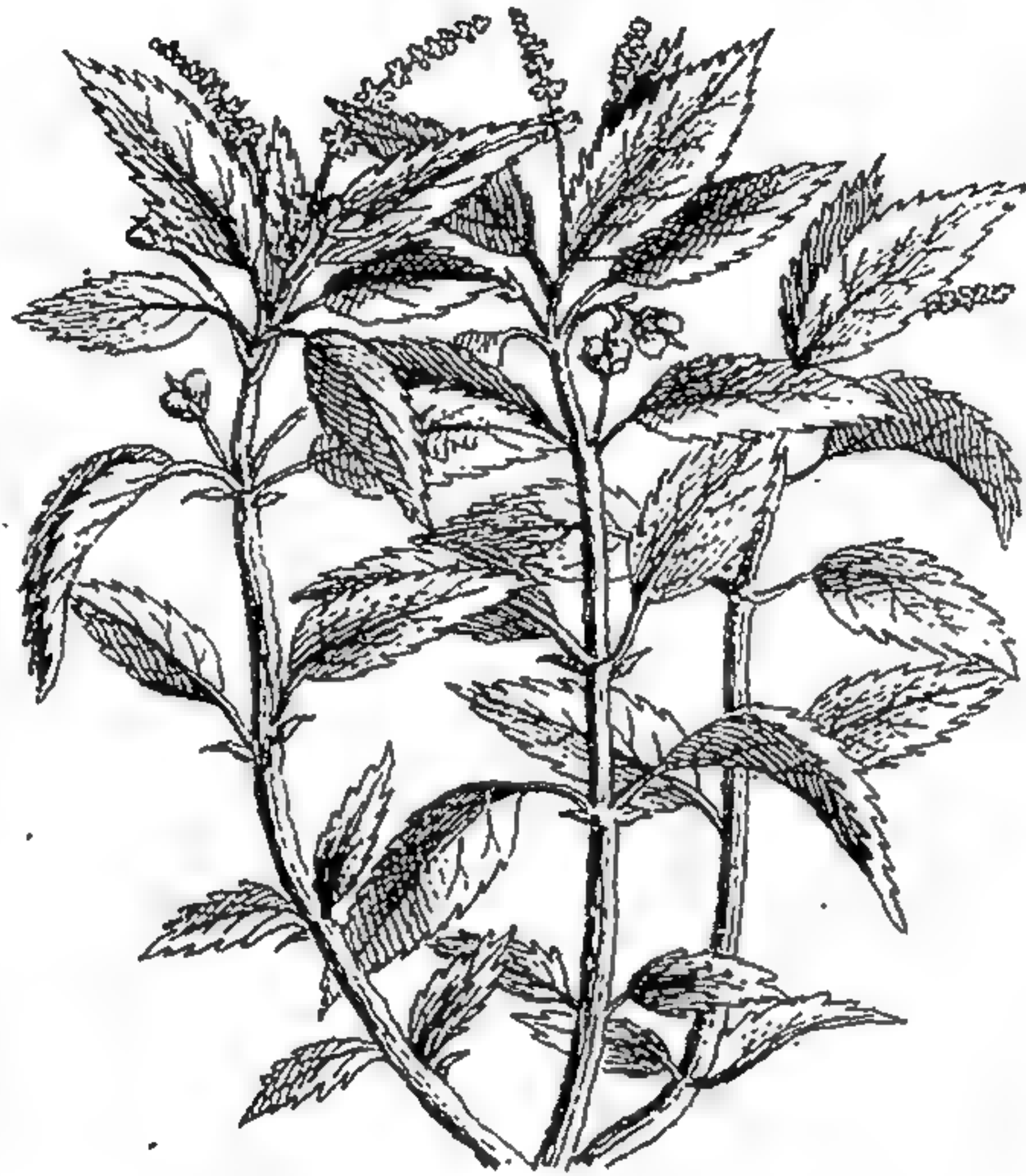
Hemlock



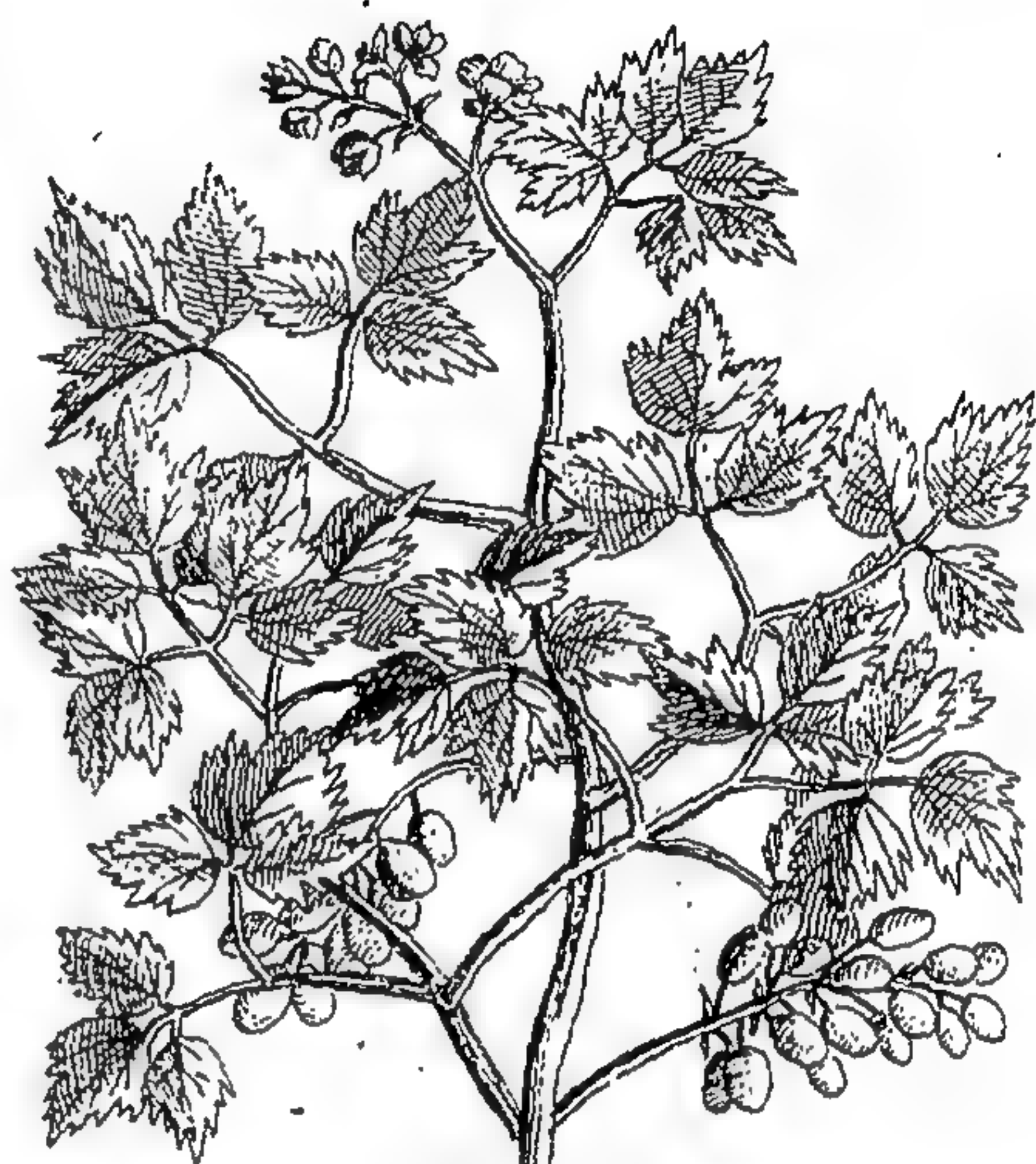
Deadly Nightshade



Water Dropwort



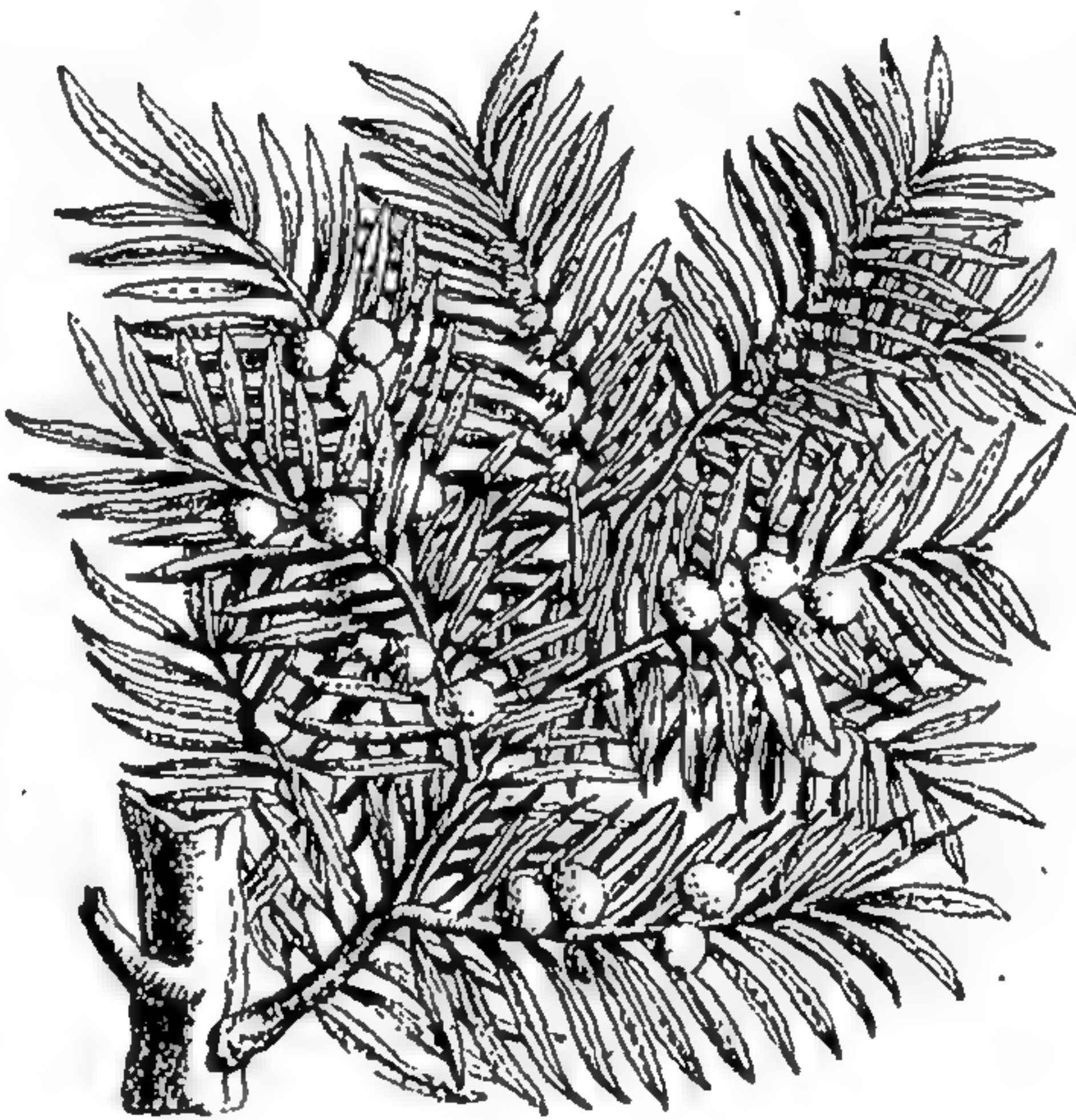
Dog's Mercury



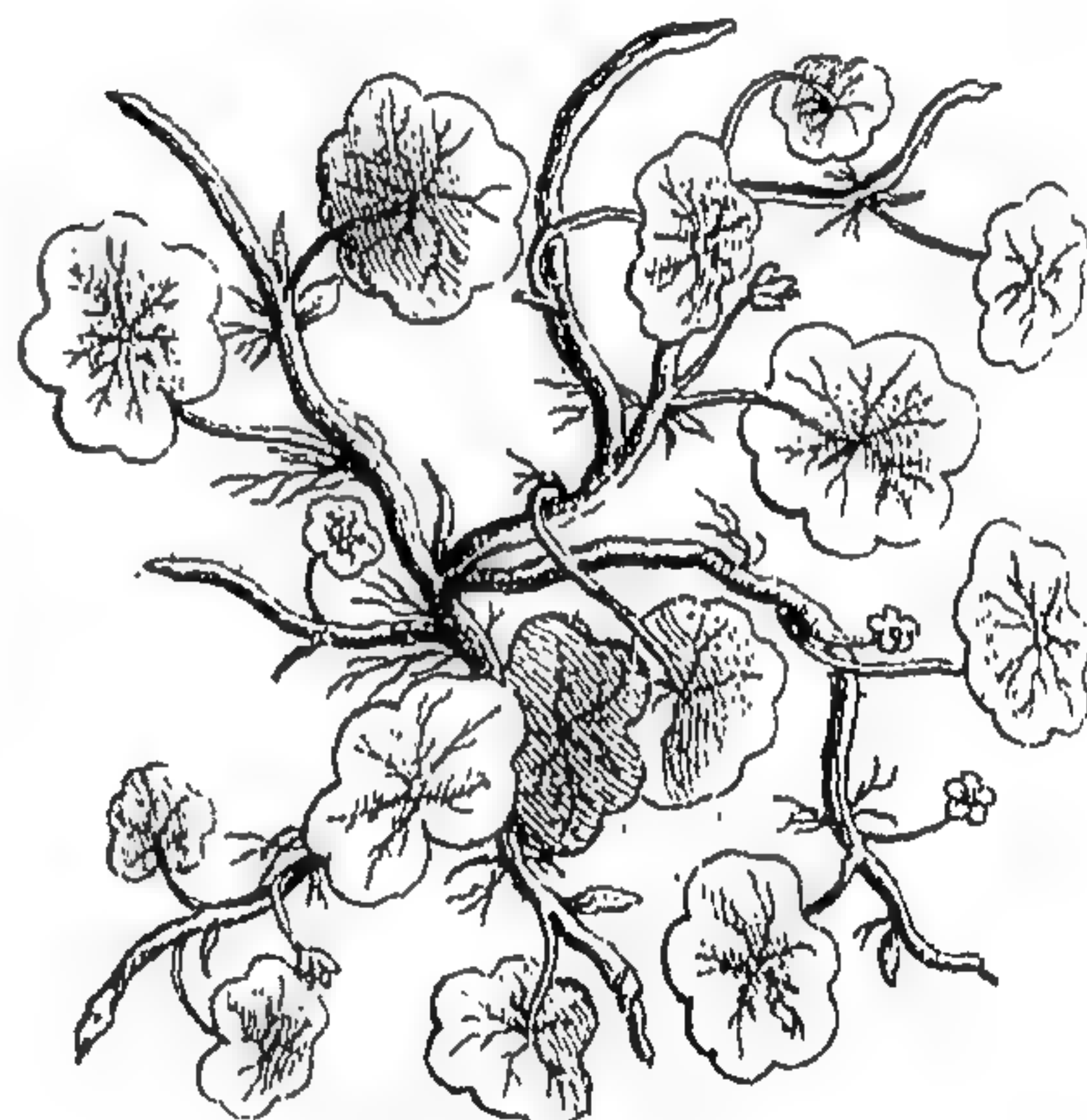
Herb Christopher



Water Crowfoot



The Yew Tree



White Rot



Common Sundew



Red Rattle



Spurge Laurel

BOOK XV. SECT. I.

Plants absolutely poisonous.

OF these we are so happy, that there are no more than eight naturally wild in ENGLAND: the Farmer will, from the Figures and Descriptions, easily be acquainted with this small Number: we shall give him an Account of their Effects, not exaggerated by Fancy of false

Histories, but from Experience and Authorities above the Reach of Question; and he will thus know what he is to avoid, both with Respect to his Family and his Cattle, and why he is to avoid them.

CHAP. I.

Of Henbane.

HENBANE is a large spreading Plant: it is capable of doing great Mischief; and, unhappily for the Farmer, it is not confined to Woods or remote Places, but grows naturally upon Ditch Banks, and is common almost every where.

Nature which has thrown it thus in the Way of Mankind, yet has stamp'd so strong a Mark of its Qualities in every Part, and given Notices of its hurtful Properties so evidently to all the Senses, that she seems to have rais'd a sufficient Caution against any Danger.

It differs from all other Plants in the Form and Hue of its Leaves: its Flowers are of a deadly dismal Colour; and the whole Plant forbidding in its Aspect. The Eye marks it for a Poison; and when offered to the other Senses, they answer in the same Language. Its Taste is filthy and nauseous, but this cannot easily come into Tryal; for its Smell, which will be perceiv'd first, is offensive and forbidding.

By this dismal Look, and this forbidding Smell, has Nature warn'd Men to beware of Henbane tho' they see it frequent about their Dwellings: we shall prevent the Possibility of mistaking it for any other Plant, by adding the Description of its several Parts.

The Root is thick, long, and irregular in its Shape. From this rise eight or ten Leaves. They are very large, long, and of a whitish or a greyish green Colour. They are very deeply indented at the Sides, and of a stinking filthy Smell.

The Stalk grows up in the midst of these, and is whitish, hard, woody, full of Branches, and two Feet high. The upper Branches spread out very much.

Many Leaves grow upon this, like those that first rise from the Root: and of the same Smell.

The Flowers are numerous and large, but they are not conspicuous. They are hollow, like a Bell, and are of a dead Colour, vein'd in a very curious Manner with Purple.

After these come short thick Seed-vessels, which are full of small brown Seeds.

Every Part of this Plant is poisonous, and it destroys People by throwing them into Drowsiness, like a Lethargy, with Convulsions.

Cattle will sometimes eat the young Leaves

of it; and this throws them into the Sleepy Evil, described before: if they have eat a great deal no Medicines can recover them. Hogs will grub up the Root, and it affects them in the same Manner.

Chickens will pick out the Seeds; and if they eat a large Quantity, they die by it. This is the Reason of its Name *Henbane*.

These are sufficient Reasons why the Farmer should let none of it grow near his Fields; but there is yet greater Cause for tearing up in his Yard where it is very common.

There have been Instances of Country Fellows eating the Roots by Mistake; and they have dy'd in the most miserable Manner in Convulsions, and with gnashing of their Teeth.

The Seeds of white Henbane which are used in Medicine, are those of a different Plant. This is altogether poisonous.

CHAP. II.

Of Hemlock.

THIS is another of those poisonous Plants which Nature, for Reasons to us unknown, has made to grow in great Abundance near our Habitations.

It is not characteris'd like Henbane, by a peculiar forbidding Aspect; yet it is a gloomy-looking Plant, and by no Means inviting to the Eye. Its Smell also is heavy, and seems to the most ignorant Person unwholesome.

There is a Sort of Hemlock which grows of itself in Gardens, and resembles Parsley; but this, tho' a very unwholesome Plant, is not the poisonous Kind. That is the large Kind which grows wild in Hedges; and it is sufficiently distinguished by its Height, its Aspect, and its painted Stalk, to prevent any Mistake to the Farmer, who shall have observed its Description and its Figure.

The Root is white, thick, long, and of an unpleasant Smell.

The Leaves that grow from this are very large, two Foot broad, but divided into innumerable small Parts, in a regular and beautiful Manner; and they are of a dull and blackish green.

The Stalk grows up in the midst of these, and it is two Yards high, and as thick as a

Child's

Child's Arm. It is of a deep dingy green, but painted in a very surprising and beautiful Manner with Manner with Purple, so that it resembles the speckled Skin of a Snake.

The Flowers are white, they are small singly, but they stand in thick and large Clusters at the Tops of the Branches.

The Seeds are roundish, of a pale green Colour, and striated. Two come after every Flower.

There are several other Kinds of this, beside that first mentioned, and the present; especially a very singular one with a thick Stalk, that grows in Waters. They are all of a poisonous Quality; but this common Hedge Kind worst of all.

The Stalks are the most poisonous Part; and next to them the Seeds. Some pretend the Root has scarce any bad Qualities; but this is not confirmed upon sufficient Experience.

The ATHENIANS extracted the Juice of Hemlock from the lower Parts of the Stalks before the Plant rose up to flower; and with this Poison they executed Criminals instead of hanging. SOCRATES died by this Dose.

The Knowledge of the poisonous Qualities of Hemlock is so common, that we do not hear of any bad Effect among our own Species who are guarded against it: but many of those Diseases of Cattle which perplex the Farmer and the Farrier, and at length end in the Creature's Death, are the Effect of eating the young Shoots of this Plant. Some Birds feed upon the Seeds without Hurt; but they are fatal to other Creatures.

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### CHAP. III.

#### *Of Deadly Nightshade.*

**T**HIS is a Plant not so common about Towns and Houses as the others; and that wherever it is seen should be rooted up, for it is fatal to Children. Nature, which has not planted this in the Way of Men so much as the other two, has not been careful to mark it as those for a Thing to be dreaded. On the contrary, it is an extremely beautiful Plant, yet with a somewhat melancholy Aspect.

The Root is long and thick, and it creeps under the Surface of the Ground.

From this rise many large and broad Leaves of a deep green Colour, and not at all notch'd or divided at the Edges.

The Stalk is round and thick, divided into many Branches, and a Yard high. It is full of Leaves like those from the Root, and toward the Top has many Flowers.

These are large, hollow like a Bell, and of a dusky Purple Colour.

After these come Berries which are large, and of a very tempting Aspect; they are of a shining and jetty black, and are as big as large black Cherries. They are ripe in July and August.

Children are tempted to eat these, and they are always fatal. A single Berry will bring on Convulsions; but they seldom stop with one or

two. They commonly die miserably a few Hours after eating them.

I remember an Instance of two Children in NORTHAMPTONSHIRE, who eat immoderately of them and did not live to get Home. They were track'd from the Plant to the Place where they fell by bloody Stools, and there died in Convulsions.

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CHAP. IV.

Of Water Dropwort.

THIS is a Plant, which, like the former, has been fatal to many Persons who have been tempted by the cleanly Look to eat of it; and which the Farmer should know, that he may guard against it with the utmost Care. The Root in this Plant possesses the greatest Degree of Poison.

It always grows by Waters, and is very common in most Parts of the Kingdom.

The Root is composed of several long and large Pieces which resemble Parsnips in Shape and Colour, and are of a sharp Taste.

The Leaves that rise from these are large, and of a pale green, and they are divided into a great Number of Segments.

The Stalks rise several together, and are upright, divided into many Branches, and a Yard high.

They have several Leaves upon them like those from the Root, and of the same faint Colour.

The Flowers are small and yellowish; they grow in great Tufts at the Tops of the Stalks, and after every one of them there come two small Seeds.

The Roots when they are fresh taken up have an inviting Aspect: they run out a white Juice like Milk when cut; and this presently after turns yellow.

Many have eat of them, and all died. We have Instances of the sad Effects from very early Time; and within these few Years the same fatal Scene has been repeated. They take the same Effect whether raw or boiled; and those who eat them die raving and in Convulsions.

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### CHAP. V.

#### *Of Dog's Mercury.*

**T**HIS is another of those Plants which tempt the Ignorant by their pleasing Aspect, and are in their Effects fatal. The whole Herb appears very inviting; it is fresh and green at a Time when every thing else is dead; and many have eat it raw or boiled, and perished by it.

It is a Plant common under our Hedges, and on which Nature has stamped no Mark of Caution: on the contrary it has a very alluring Look.

The Root is slender and long; it divides into many Branches, and spreads under the Surface of the Ground.

The Stalks are round, upright, not at all branched, of a faint green, and about a Foot high.

They



They are almost naked toward the Bottom, but nearer the Top there stand many Leaves; these are long and notched at the Edges; and they are of a very bright pleasant Green.

The Flowers are inconsiderable. On some Parts there stand Spikes of a greenish Colour, and on others Seeds, which are as it were double.

The Plant is in full Vigour early in Spring, and its fresh, green, and wholesome Look has tempted many to boil it for Food. Whole Families have been poisoned by it. The Children have generally died; sometimes the Father and Mother have recovered; but in other Instances all have perished together. They die in Convulsions, and in the greatest Agonies.



## CHAP. VI.

### Of Herb Christopher.

**T**HIS is a Plant as fatal in its Effects as any; but very happily it is found in few Parts of this Kingdom, and there generally in Woods, and far remote from Dwellings.

The Root is long, thick and whitish.

From this rise several large Leaves, supported on long, reddish Foot-stalks. Each Leaf is divided into many small Parts, or is as it were composed of many small ones; and it is of a deep green Colour.

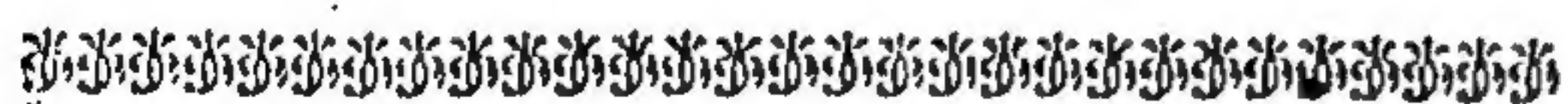
The Stalk rises in the Midst of these, and is round, upright, reddish, and two Feet high.

Several Leaves grow upon this, which in all Respects resemble those from the Root, and are when rubbed or bruised of an unpleasing Smell.

The Flowers stand in long Clusters upon small Stalks growing at the Top of the Plant, and from the Bosoms of the Leaves; they are small and White.

The Berries that follow these hang in the Manner of Bunches of Currants, and they are of a shining black Colour. They are ripe in Autumn.

Children who have gone out to gather Blackberries have been tempted to eat these, and have in Consequence died in Convulsions. The Plant has been from this named Bane-berries. The young Shoots also poison Cattle.



## CHAP. VII.

### Of Water Crowfoot.

**E**VERY one knows the common Crowfoot of the Meadows, which Children call Butter Cups: this is of a burning and caustick Quality; but there is one Kind of it which has been sometimes eaten, and has never failed to prove a very desperate Poison, destroying People in a particular and very frightful Manner. This Kind is common in watery Places, and is perfectly different from all the others, and indeed

from all other Plants; so that the Husbandman will have no Difficulty in knowing it at Sight, by the Means of our Description and Figure.

The Root is composed of a great many fine white Threads.

The Leaves rise from this, a great many together; and they are broad, of a roundish Shape, but irregularly divided about the Edges into three or more Parts: they are smooth, of a shining Surface, and of a pale yellowish green Colour.

The Stalk rises up in the Midst of these, and is very thick, fleshy, of a pale green Colour, two Foot high, and divided into a great many Branches.

Several Leaves grow upon this which in all Respects resemble those from the Root, and are like them of a pale green Colour.

The Flowers stand at the Tops of the Branches: they are very small and yellow; and they resemble the common Crowfoot Flowers in Shape, but they are paler coloured.

The Seeds follow these, and are small and green; they stand clustering together in a Kind of oval Heads, and easily fall off when touched.

The Plant is common about the Edges of Ponds; and where Water has stood in Winter. Its Leaves are up early in Spring, and by their Freshness tempt Cattle and sometimes Men to eat them. They are the Causes of many of those Disorders which affect Cows and Oxen in the early Season.

Their Effect on Mankind is terrible: Death is a certain Consequence; and they die laughing.



## CHAP. VIII.

### Of Yew.

**T**HE Yew is a Tree too well known to need a long Description. Its Trunk is covered with a reddish Bark: Its Branches spread irregularly, and its Leaves are composed of many small and narrow ones, which stand regularly on the two Sides of a Stalk in Rows; and are of a blackish Green.

The Fruit is of a particular Form and Appearance; it is composed of a green Button placed in a red juicy Cup, resembling the Husk of an Acorn.

The Tree is wild in our Woods in many Places, and is planted also for Ornament; being an Ever-green.

Children eat the juicy Part of the Fruit, which happily is not poisonous, or in the least of Kin to the rest of the Tree.

The Farmer's Care must be to keep his Cattle from the Leaves. They will frequently eat the Clippings thrown out of Gardens, or the young Shoots when it is planted where they can get at it.

When they eat but little of it, they fall into Disorders which often end in their Death: but when they swallow it in a larger Quantity, they die presently.



## B O O K XV.

## S E C T. II.

*Such as are not absolutely poisonous, but very hurtful.*

## C H A P. IX.

*Of White Rot.*

**T**HIS is a little obscure Plant, which often grows in great Abundance where it is little minded, and is the Cause of very terrible Mischief to the Farmer.

It consists principally of a Parcel of Stalks which lie upon the Ground; and spread themselves about in a very irregular Manner. They are as small as a Packthread, and of a pale whitish green. Sometimes they rise a little upwards, but rarely.

These Stalks send down little Tufts of fibrous Roots in various Places; and generally where these shoot from the lower Part, there rise also from the upper Side, Leaves.

These are as large as a Half Crown-Piece, and of a round Shape, but indented irregularly at the Edges. The Stalk which supports them, is long and slender; and it is inserted not at the Edges, as in most other Plants, but in the Middle.

The Colour of the whole Leaf is whitish, and it is of a thin Substance.

The Flowers are very small and inconsiderable: they are of a pale Colour, and they stand on slender Foot-stalks rising from the Bosoms of these Leaves, or the Part where their Foot-stalk joins to the main Stalk. The Seeds are small and brown.

This is the whole of a Plant, whose low Condition renders it unsuspected by the Farmer, while it is the Ruin of his Flock.

It is very common in marshy Grounds, where it runs close to the Bottom, and is hid among the Grass.

The Sheep find it, tho' their Owner does not perceive it; and they eat of it abundantly among the Grass, being pleas'd with its sharp Taste. The Consequence is, their falling into that terrible Distemper the Rot: from which few, that have swallowed any large Quantity of this Herb, escape.

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## C H A P. X.

*Of Sun-dew.*

**T**HIS is another of those Plants which is fatal to Sheep; and which, in the same Manner, is often overlook'd by those who know its bad Effects; by Reason of its Smallness: but in this they are the less to be excus'd, because, tho' a very little Plant, its Singularity renders it conspicuous.

It is but about six Inches high, but it strikes the Eye at first, by being all over of a red Colour; and, upon a closer Examination, it sur-

prises yet more, by being covered with large Drops of Water in the most violent Heats: it hence obtained the ENGLISH Name Sun-dew; and it is also called frequently Rosa Solis.

The Root is composed of a few small Fibres.

The Leaves rise in a little Tuft eight or ten together. Each is supported on a long slender Foot-stalk. They are of the Bigness of a Silver Penny, round, of a red Colour, but covered with very long and stiff yellow Hairs: upon these rest the great Drops of Water.

The Stalk rises in the midst of these, and is about six Inches high: it is upright, very slender, and has no Leaves upon it. It generally divides into two Parts at the Top, but otherwise it has no Branches.

The Flowers grow in a Row at the Top: they are small and white; and they seldom open perfectly. The Seed-vessel is short, and the Seeds are very small.

This Plant grows, like the former, on boggy Grounds; and it has, like that, a sharp Taste, for which the Sheep like it. They eat it too frequently, and its Effects are the same as those of the former. It brings on the Rot; and those which have eat much are incurable.

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## C H A P. XI.

*Of Lousewort.*

**T**HIS is another Inhabitant of the wet and marshy Grounds, which is hurtful to Sheep in a terrible Manner, though not so fatal as the others.

It is a much larger Plant than either of those, and easier seen, but it is as often overlook'd or disregarded.

The Root is compos'd of a vast Number of Fibres, which run deep in the Ground.

The Leaves rise in little Tufts from this, and they are small, and beautifully divided into a Number of lesser Parts. They are of a fleshy Substance, and of a faint green; but very often they are brown, and sometimes reddish.

The Stalks are weak, and do not stand well upright: they are six or eight Inches long, and of a reddish Colour. They have many Leaves on them, in all Respects resembling those which grow from the Root; and at their Tops stand the Flowers.

These are gaping, and of a full red; and they stand in reddish and streaked Husks.

All our wet Meadows abound with this Plant. Its juicy Substance and Taste allure the Sheep to eat of it; in those Places especially where there is but little Grass, which is too common a Case where this Plant is abundant; and it throws them into many Disorders.

There



There is no Herb that has so speedy, evident, and certain an Effect in fouling the Blood. The most healthy and clean Flock, will, in a Fort-night, grow scabby and scurfy upon the Skin; their Wool will be loose, and they will be overrun with Vermin.

We have, in a preceding Part of this Work, delivered the Method of curing this Disorder; and the Farmer must be careful to observe the Direction of removing the Sheep under Cure to a dry upland Pasture. Those are Places where the Plant cannot grow; and there is no Security but that of the Creature's not feeding upon it, while under Cure.

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## CHAP. XII.

### Of Spurge-Laurel.

**T**HIS is a shrubby Plant of a very pleasing Aspect, and worthy to be introduced as an Ornament into Gardens; but it is one that the Farmer should extirpate carefully from his Fields when he happens to have it. The singular Appearance renders it easily known, and it is only found on hilly Grounds.

The Root is composed of several long and tough Fibres.

The Stem is as thick as a Man's Thumb; and it is covered with a brown Bark.

Toward the Bottom it is naked; but there are numerous Leaves about the upper Part. The

whole Shrub is three or four Foot high; and the Leaves grow principally at the extrem Ends of the Branches.

They are long, broad, and of a firm Substance: their Colour is a deep green; and they in some Measure resemble the Leaves of the common Laurel.

The Flowers grow in Clusters below the Leaves, and they are small and green.

After them come Berries, which when ripe are black: they are of a longish Shape, and have a single large Kernel.

It is frequent on waste Ground in hilly Places in many Parts of ENGLAND, and flowers very early in Spring.

Cattle are tempted by the Freshness of the Leaves to taste them; and they are so sharp that they inflame their Mouths. Some will eat them in small Quantities, and the Effect is terrible; they bring on the most violent Purgings with bloody Stools; and often these Complaints resist the Power of all Remedies, and terminate in the Creature's Death.

I had in the Year 1740 an Instance of this in three Cows, which had been seen eating the Tops of this Shrub in APRIL. They all fell into these Purgings, and though every Method was used that could be thought of, all three died.

We have elsewhere in its Place informed the Husbandman in what Manner he is to undertake the Cure of these Disorders; but it is much better to prevent them by rooting out such hurtful Plants, as are their worst Cause.

The E N D.

